A STUDY ON ACCURACY OF MAGNETIC RESONANCE CHOLANGIO PANCREATOGRAPHY (MRCP) VS ENDOSCOPIC RETROGRADE CHOLANGIO PANCREATOGRAPHY (ERCP) IN PANCREATICOBILIARY DISORDERS

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CHENNAI – 600 032

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CERTIFICATE

This is to certify that the dissertation entitled **"A STUDY ON ACCURACY OF MAGNETIC RESONANCE CHOLANGIO PANCREATOGRAPHY (MRCP) Vs ENDOSCOPIC RETROGRADE CHOLANGIO PANCREATOGRAPHY (ERCP) IN PANCREATICOBILIARY DISORDERS"** presented here is the bonafide original work done by **Dr.A.MAHABOOBKHAN,** in the Barnard Institute of Radiology and Madras Medical College, Chennai 600003, in partial fulfilment of the requirements for the **M.D Radiodiagnosis,** Branch - VIII Examination of the Tamil Nadu Dr.MGR Medical University to be held in April 2012.

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DECLARATION

I, **Dr.A.MAHABOOBKHAN**, solemnly declare that this dissertation entitled, **"A STUDY ON ACCURACY OF MAGNETIC RESONANCE CHOLANGIO PANCREATOGRAPHY (MRCP) Vs ENDOSCOPIC RETROGRADE CHOLANGIO PANCREATOGRAPHY (ERCP) IN PANCREATICOBILIARY DISORDERS"** is a bonafide work done by me for the degree of M.D. during the period of **June 2009 to May 2012** under the guidance and supervision of **Prof.Vanitha .K, M.D., D.M.R.D., D.R.M.,** Director and Professor, Barnard Institute of Radiology, Madras Medical College, Chennai – 600 003. This dissertation is submitted to The Tamil Nadu Dr.M.G.R. Medical University, towards partial fullfillment of requirement for the award of M.D. Degree in Radiodiagnosis, (Branch- VIII).

Place: Chennai
Date:

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CONTENTS

INTRODUCTION

Wallner B K et al introduced MRCP in 1991, using a breath hold, two dimensional T2 weighted gradient echo sequence using steady state free precession (SSFP).

Laubenberger in 1995 introduced Modified Fast Spin Echo (FSE) sequences.

TECHNIQUE

MRCP is usually performed with heavily T2-weighted sequences by using fast spin-echo or single-shot fast spin-echo software and both a thick-collimation (single-section) and thin-collimation (multisection) technique with a torso phased-array coil.

By using heavily T2- weighted sequences, the signal of static or slow- moving fluid- filled structures such as the bile and pancreatic ducts is greatly increased, resulting in increased duct-to-back- ground contrast.

The coronal plane is used to provide a cholangiographic display, and the axial plane is used to evaluate the pancreatic duct and distal common bile duct.

Single-shot fast spin-echo is a newer and more rapid MRCP sequence that can be performed in a single breath hold, thereby significantly reducing motion artifacts and increasing image quality. As a result of less motion artifact (noise) with single-shot fast spin echo MRCP, the signal-to-noise ratio increases compared with that of fast spin-echo MRCP.

SERIES-1: LOCATOR

SSFSE shows the abdominal anatomy well. It is done preferably with a breathhold in expiration so it can be used for planning Series-2 and 3 Axial T2 and T1. With SSFSE use a sufficiently large FOV (ie. set FOV to width of patient) to eliminate wrap-around artifact.

SERIES-2: AXIAL T2

This sequence identifies hepatic, pancreatic and other lesions. It shows the common bile duct to guide acquisition of coronal oblique MRCP sequence.

SERIES 3: AXIAL IN-PHASE (FAT SATURATION)

This sequence is excellent for evaluating pancreatic pathology and especially for identifying pancreatic masses.

THICK SLAB

The first step in performing MRCP is to localize the biliary tract and pancreatic duct.

During the single-section acquisition, we can obtain six or seven 20-mm-thick coronal sections through the porta hepatis and rotating around a point anterior to the portal vein.

Thick slab MRCP technique permits depiction of the majority of the biliary tract and pancreatic duct on a single image.

THIN SLAB

During the thin-collimation, multisection acquisition, 5-mm sections in the straight coronal plane are obtained with a 100% intersection gap and a gap-and-fill technique during one breath hold of less than 30 seconds.

1) Prescribe this series from the axial T2 series. Select an image which shows the common bile duct (CBD).

2) Use 5 mm thick with 0 gap slices

3) 15 slices takes about 30 seconds, which is reasonable breath hold.

4) Coronal View: Set the imaging volume from posterior to the CBD as it passes through the head of the pancreas to anterior to the porta hepatis. Ideally the entire gallbladder should be included within the 15 slices.

5) RAO: Rotate 20-30 counterclockwise and include the CBD.

6) LAO: Rotate 20-30 clockwise centered on the CBD and gallbladder should be included in the view.

7) Axial: Set the axial plane at 4-5 mm slice thickness which is useful in patients with suspected of pancreatic divisum.

ANATOMY OF BILIARY TREE IN MRCP

lntra hepatic biliary radicle join together to form segmental ducts which join together to form the right and left hepatic ducts, Segmental ducts are demonstrated in 90% of MRCPs. Right and left hepatic ducts are visualised in 96% of MRCPs. MRCP is 95% accurate in differentiation of normal from dilated ducts.

The common hepatic duct is formed by the confluence of right and left hepatic ducts in the portahepatis. The normal common hepatic duct measures less than 7mm. The cystic duct which arises from the neck of the gall bladder joins the common hepatic duct to

form the common bile duct. The normal common bile duct diameter is upto 10mm in diameter.

NORMAL PANCREATIC DUCT

Pancreatic duct is usually not seen in its entirety on a single source image,because the pancreatic duct is curved and obliquely oriented.So an image with thick collimation (2–3 cm) can demonstrate the duct in its entirety is needed.

NORMAL VARIANTS IN PANCREATIC DUCT COURSE

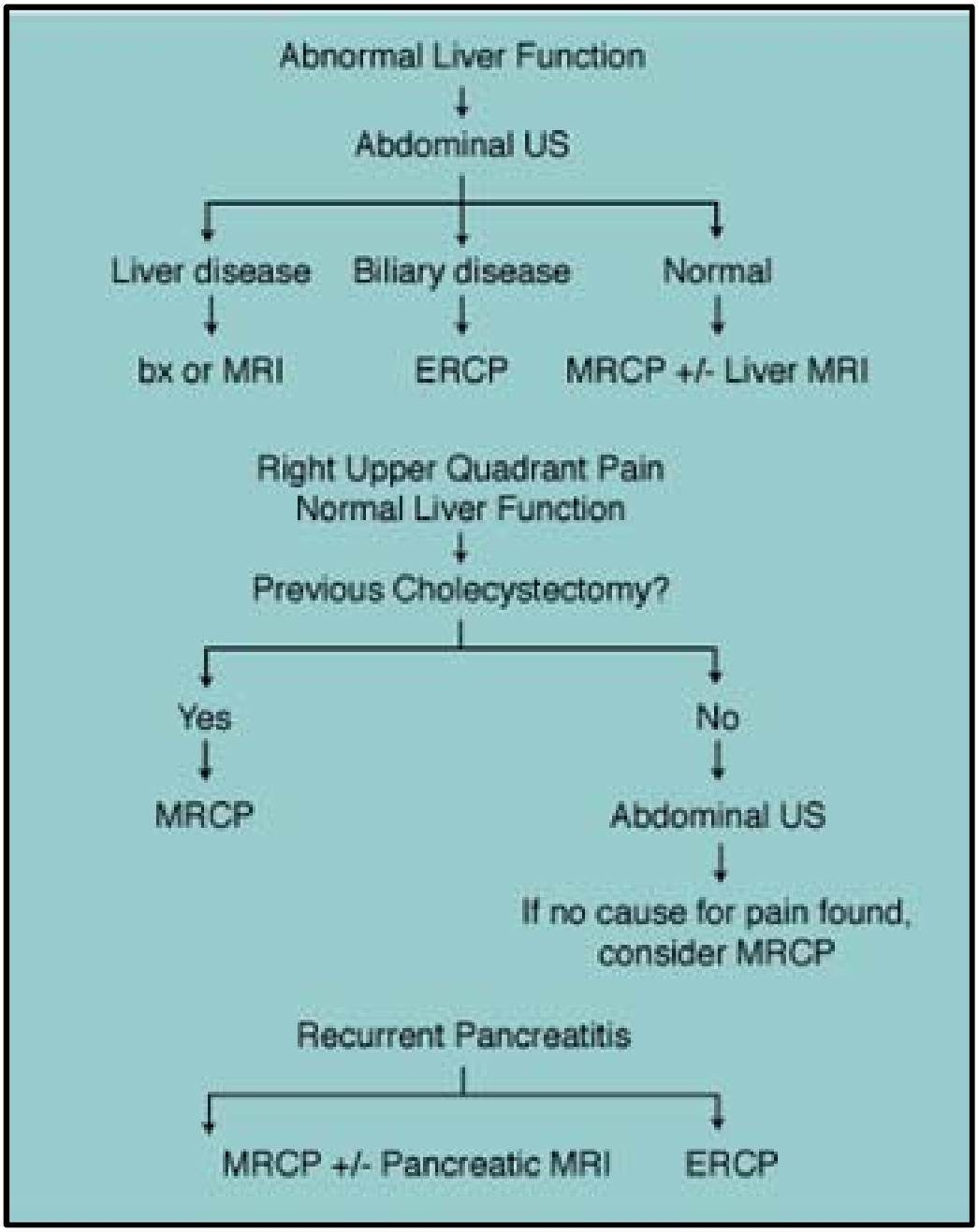
The normal pancreatic duct course varies considerably. Four types have been described, descending, vertical, sigmoid and loop. The most common is the descending variety. The sigmoid type of course can be mistaken for extrinsinc mass effect, the vertical type may be mistaken for the common bile duct and the loop type for a stricture.

ERCP TECHNIQUE

Endoscopic retrograde cholangiopancreatography (ERCP), developed in the 1970s, was initially designed for diagnostic imaging of the biliary tree. Therapeutic biliary applications for ERCP developed soon after its initial introduction, and pancreatic applications soon followed. ERCP is performed using a side-

viewing duodenoscope, which allows for views of the medial wall of the duodenum, including an en face view of the ampulla. An instrument channel in the duodenoscope enables cannulation of the ampulla of Vater under direct visualization, and injection of contrast into the bile duct and pancreatic duct to obtain diagnostic images.

The clinical applications of MRCP are numerous and include the diagnosis of common bile duct stones; malignancies of the pancreaticobiliary tract; congenital anomalies such as choledochal cysts, aberrant bile ducts, and pancreas divisum; primary sclerosing cholangitis (PSC); acute and chronic pancreatitis; and gallbladder disease such as stones and carcinoma. MRCP is also useful in the evaluation of patients who have experienced an incomplete or failed ERCP attempt and in the evaluation of patients in whom the performance of ERCP is difficult or impossible due to surgical alterations of the gastrointestinal tract.


Abnormal Liver Function
Abdominal US
Liver disease
Biliary disease
Normal
bx or MRI
ERCP
MRCP +/- Liver MRI
Right Upper Quadrant Pain
Normal Liver Function
Previous Cholecystectomy?
Yes
No
MRCP
Abdominal US
If no cause for pain found, consider MRCP
Recurrent Pancreatitis
MRCP +/- Pancreatic MRI
ERCP

CAUSES OF BILIARY OBSTRUCTION

Anatomical location	Malignant	Benign
Hilar	Gallbladder carcinoma Hepatocellular carcinoma	
low/midduct	Pancreatic carcinoma Periampullary carcinoma	Pancreatitis [acute or chronic]
either	Cholangio Carcinoma Metastases Lymphoma Benign biliary tumors	Stones Mirizzi syndrome Postoperative strictures Primary sclerosing cholangitis Other cholangiopathy Hemobilia Parasites

AIM OF THE STUDY

A study on accuracy of magnetic resonance cholangio pancreatography (MRCP) Vs endoscopic retrograde cholangio pancreatography (ERCP) in the evaluation of pancreaticobiliary disorders.

REVIEW OF LITERATURE

1.Hurter, D.; De Vries, C.; Potgieter, P.H.; Barry, R.; Botha, F.J.H.; Joubert, G. 2008 et al; Fifty-two patients with suspected pancreatobiliary pathology were included in this prospective observational study. MRCP was performed in the 24-hour period prior to ERCP. MRCP had sensitivity, specificity, positive and negative predictive values of 87%, 80%, 83.3% and 84.2% respectively for choledocholithiasis.

2. Sica GT, Miller FH, Rodriguez G, et al.2002, In thier study, the diagnosis of chronic pancreatitis was established by a combination of history, symptoms, pancreatic enzyme abnormalities CT, and ERCP. Twenty-two out of twenty-three patients with chronic pancreatitis had ERCP. The severity of the chronic pancreatitis was not specified.The same patients were subjected to MRCP. Abnormality on fat suppressed T1-weighted images was present with greater frequency and magnitude than wasabnormality on arterial or portal phase enhancedsequences. The sensitivity to pancreatitis using all sequences was 92%, but specificity was only 50%,

3. Do Hyun Park MD, Myung-Hwan Kim MD Aug 2005 et al

The study design was an 8-year retrospective survey conducted at a tertiary referral center, Asan Medical center (University of Ulsan College of Medicine, Seoul, Korea). There were 72 patients with choledochal cysts. All patients underwent both MRCP and ERCP. MRCP findings were compared with those of ERCP as the criterion standard.The overall detection rate of MRCP for choledochal cysts was 96% (69/72). The sensitivity, the specificity, the positive predictive value, and the negative predictive value of MRCP for classifying choledochal cysts according to Todani's classification were 81%, 90%, 86%, and 86% in type I, respectively; 73%, 100%, 100, and 95% in type III, respectively; 83%,

4. Mi-suk park,Taekyoung kim-RSNA 2004 et al; To retrospectively evaluate criteria for differentiating extrahepatic bile duct cholangiocarcinoma from benign cause of stricture at magnetic resonance cholangiopancreatography (MRCP) and to compare diagnostic accuracy with this modality versus endoscopic retrograde cholangiopancreatography (ERCP). MRCP and ERCP images in 50 patients (27 with cholangiocarcinoma [18 men, nine women; mean age, 58 years] and 23 with benign cause of stricture [13 men, 10 women; mean age, 60 years]) were retrospectively

reviewed to assess the appearance of bile duct strictures. Final diagnosis was based on surgical or biopsy findings. Strictures were described according to their imaging appearance (irregular or smooth margins, asymmetric or symmetric narrowing, abrupt narrowing or gradual tapering, and presence or absence of double-duct sign). Sensitivity, specificity, and accuracy of MRCP and ERCP were calculated by using ratings of confidence in image-based diagnosis. Lengths of stricture were and compared by using the Student *t* test. Among cholangiographic criteria for malignant biliary stricture, irregular margins and asymmetric narrowing were more common in cholangiocarcinomas (24 [89%] of 27 patients) than in benign strictures (six [26%] and eight [35%] of 23 patients, respectively). Sensitivity, specificity, and accuracy of the two methods for differentiation of malignant from benign causes of biliary stricture were 81% (22 of 27), 70% (16 of 23), and 76% (38 of 50), respectively, for MRCP and 74% (20 of 27), 70% (16 of 23), and 72% (36 of 50), respectively, for ERCP. Mean length (± standard deviation) of cholangiocarcinomas was 30.0 mm ± 8.5, and that of benign strictures was 13.6 mm ± 9.1 ($P < .001$).

MRCP compared to diagnostic ERCP for diagnosis when biliary obstruction is suspected: 2006 Kaltenthaler et al; A systematic review

of studies comparing MRCP to diagnostic ERCP in patients with suspected biliary obstruction was conducted. Sensitivity, specificity, likelihood ratios, were reported. 25 studies were identified reporting several conditions including choledocholithiasis (18 studies), malignancy (four studies), obstruction (three studies), stricture (two studies) and dilatation (five studies). Three of the 18 studies reporting choledocholithiasis were excluded from the analysis due to lack of data, or differences in study design. The sensitivity for the 15 studies of Choledocholithiasis ranged from 0.50 to 1.00 while specificity ranged from 0.83 to 1.00. The positive likelihood ratio ranged: from 5.44–47.72 and the negative likelihood ratio for the 15 studies ranged from 0.00–0.51. Significant heterogeneity was found across the 15 studies so the sensitivities and specificities were summarised by a Receiver Operating Characteristic (ROC) curve. For malignancy, sensitivity ranged from 0.81 to 0.94 and specificity from 0.92 to 1.00. Positive likelihood ratios ranged from 10.12 to 43 and negative likelihood ratios ranged from 0.15 to 0.21.

6.Guibaud L, Bret PM, Reinhold C, Atri M,BarkunAN.1995 et al; In their study MRCP was comparable with ERCP in detection of obstruction, with a sensitivity, specificity, and accuracy of 91%,

100%, and 94%, respectively.It is 94% sensitive and 93% specific for detection of dilatation (7). MRCP play arole in the preoperative work-up of these patientsundergoing biliary surgery(8). Because of the very high signal-to-backgroundratio of bile, calculi are readily identified as darkfilling defects within the high-signal-intensity fluid at MRCP. Calculi as small as 2mm in diameter can be visualized (9), andthe accuracy of stone detection is greater with single-shot fast spin-echo techniques because ofthe reduction of motion and susceptibility artifacts.Small calculi may not cause secondary dilatation of the ducts (10) and are best seen on the axial images (10). The differential diagnosis of filling defects inthe bile ducts most commonly includes stones and air bubbles; however, neoplasms, bloodclots, concentrated bile, metallic stents, flowvoids, and susceptibility artifact from surgicalclips must be excluded (11).

7.Holzknecht N,Gauger J, Sackmann M, et al. In their comparative study MRCP showed more accurate assessment of ductal caliber in the physiologicstate, unlike ERCP, with which ductalcaliber may be overestimated because of injectionpressure .The determination of the sensitivity and specificityof ERCP in the diagnosis of choledocholithiasisis difficult because ERCP

is considered thestandard of reference for common bile duct stone detection. In an analysis of 72 patients studied with intraoperative cholangiography and ERCP, ***Frey et al*** [11_}found a sensitivity of 90% and a specificity of98% for ERCP in the setting of choledocholithiasis..

.Liu T,Consorti E,Kawashima A,et al. studied ERCP was probably best reserved for those with increased suspicion of CBD stones by noninvasive criteria that will likely require therapy[12]. .Such noninvasive criteria can help to determine the optimal patient to undergo ERCP (for both diagnosis and therapy) without further testing. In patients with acute cholangitis, ERCP has improved the clinical course, should be performed within 24 hours of presentation, and is less morbid than percutaneous transhepatic cholangiography or CBD exploration [13]. Endoscopic retrieval of CBD stones and clearance of the duct is successful in over 90% of cases on the first attempt [14,15]. A variety of adjunctive techniques may be utilized, which include sphincterotomy,basket extraction, balloon extraction,mechanical lithotripsy, and electrohydraulic lithotripsy. All can be performed via the instrument channel of the duodenoscope. In the case of CBD stones that cannot be removed using standard ERCP techniques

(sphincterotomy with balloon or basket extraction) stents have proven useful. Stents, placed during ERCP, provide biliary drainage in the setting of unextractable stones and may help fragment large stones, allowing for spontaneous or subsequent ERCP clearance.

Lopera JE, Sota JA,Munera F. et al studied MRCP was particularly well suited to the detection and staging of hilar cholangiocarcinoma because MRCP readily depicted the length of the extrahepatic bile duct involved by the disease as well as the proximal extent of disease—an important factor in determining resectability [16]. In contrast to ERCP MRCP is particularly advantageous because it depicts the ducts located proximal and distal to a high-grade obstruction. This is possible because ductal depiction at MRCP simply relies upon the presence of fluid in the ducts and not on opacificationof the ducts with contrast material. Therefore, MRCP is useful in identifying multiple segmental obstructions of the intrahepatic ducts that may not be opacified at ERCP. The identification of isolated obstructions is helpful in providing a road map for planning percutaneous interventions.

More than 80% of bile duct strictures occur after an injury to the extrahepatic bile ducts during a cholecystectomy (17,18),

MRCP has been shown to be comparable with ERCP in demonstrating the location and extent of strictures of the extrahepatic bile duct, with sensitivities of 91%–100% (19,20).

Helzberg J,Peterson JM,Boyer JL. et al. studied Acute bacterial cholangitis and biliary stones maycomplicate PSC in up to one third of patients [21,22], Patients with PSC were at increased risk to develop cholangiocarcinoma [23]. Given their underlyingdisease, this complication was often difficult to diagnose noninvasively. ERCP provided a method for tissue sampling that is unavailable to other imaging modalities, and additionally provides means for palliativemeasures.

Freeny PC,Bilbao MK,Katon RM.et al studied at MRCP, dilatation of both the pancreatic and bile ducts was highly suggestive of a pancreatic head malignancy(24).

MRCP has been shown to be accurate in demonstrating the cause of obstruction, with positive and negative predictive values of 93% and 94%,respectively, for benign causes and 86% and98%, respectively, for malignant causes(6,25,7). MR cholangiography can demonstratethe presence and extent of strictures; allow determination of the resectability of the lesion; and provide a road

map for subsequent surgical, percutaneous, or endoscopic intervention.

Sica GT, Braver J,Cooney MJ et al. In their comparative study Patients with severe acute pancreatitis and suspicion of CBD stones were benefited from urgent ERCP with sphincterotomy [26,27]. One cause of recurrent idiopathic acute pancreatitis include sphincter of Oddi dysfunction .ERCP may have a role in evaluating and treating patients with this disorder. Manometry studies of the biliary and pancreatic sphincter can be performed during ERCP, with subsequent endoscopic sphincterotomies with or without stent placements for treatment [28].

Primary role of MRCP in the evaluation of chronic pancreatitis lies in defining biliary and pancreatic duct anatomy and disease extent prior to surgical drainage procedures. MRCP is accurate in detecting common ductal manifestations of chronic pancreatitis such as dilatation, strictures, and stones ,as well as less common manifestations such as thoraco pancreaticfistulas [29,30]. MRCP is well suited to the detection of pseudocysts not opacified at ERCP. In addition to depicting the morphologic changes of chronic pancreatitis, recent studies reveal the utility of MRCP in

assessing functional abnormalities of the exocrine pancreas.

Smits ME,,Rauws EA, Tytgat GN,et al Pancreatic duct stones, strictures, fistulas, chronic pain, and pseudocyst formation may complicate chronic pancreatitis. Endoscopic therapy retains an important role in the treatment of these complications. Pancreatic duct stones, which may obstruct the duct and cause or worsen pancreatitis, can be removed during ERCP [31,32]. Endoscopic dilation and stenting of strictures can provide temporary pain relief, but long-term results appear unsatisfactory due to stent occlusion [33]. Pancreatic duct leaks and fistulas may occur secondary to pancreatitis or trauma, and have been successfully managed using transpapillary stents [34].

Biliary-enteric anastomoses such as choledochojejunostomy, hepatico jejunostomy, and BillrothII anastomosis make it difficult or impossible to access the major papilla at endoscopy. In patients with such anastomoses, MRCP is the imaging modality of choice for the work-up of suspected pancreaticobiliary disease. It has been reported that MRCP is 100% sensitive in detection of anastomotic strictures and 90%sensitive in detection of biliary tract stones proximal to the anastomosis (35). MRCP is also 100% sensitive in

demonstrating the choledochojejunal anastomosis after a Whipple procedure.

Mortele KJ Ros PR 2001 et al studied variations in the branching pattern of the intrahepatic bile ducts occur in 37% of individuals [36].MRCP performs well in the depiction of biliaryvariants [37,38]. These include accessory right and left hepatic ducts that enter the extrahepatic bile duct caudal to the confluence, trifurcation anomalies, cross-over anomalies such as the dorsocaudal branch of the right hepatic duct entering the central left hepatic duct, and cystic duct anomalies. MRCP play an important role in the detection of biliary variants prior to laproscopic cholecystectomy.

Bret PM ,Reinhold C ,Taourel P,1996 et al studied MRCP has 100% accuracy in detection of pancreas divisum (39). Annularpancreas is characterised by extension of pancreatic tissue completely surrounding the duodenum. on MRCP a definitive diagnosis can be offered. The pancreatic duct is seen circling around the duodenum.

Although ERCP provides high-quality images of the pancreaticobiliary tract in many instances, failed or incomplete

ERCPs occur in up to 10% to 20% of all attempts. Failed or incomplete ERCPs are most often technical in nature, but may be related to anatomic abnormalities such as periampullary diverticula,duodenal stenosis, or obstructing gastric neoplasms(40).MRCP is useful in detecting and excluding abnormalities in this patient population.

MATERIALS AND METHODS

Study design: prospective study

Place: Barnard Institute of Radiology, Rajiv Gandhi Government General Hospital, Madras medical college, Chennai -3

Collaborating Unit: Department of Medical Gastroenterology, Rajiv Gandhi Government General hospital. Madras Medical College, Chennai-3.

Study population: 50 patients were included in the study. The study group consisted of male and female patients, between the age of 22 to 65 years (with a mean age of 43 years). For all 50 patients per operative findings were obtained.The study was Approved by the institutional ethical committee .

Sample Size:50

Study period-2009 -2011

Consent : Informed consent obtained from all patients.

INCLUSION CRITERIA

- Patients who were having a history of obstructive jaundice, pain abdomen and cholangitis
- 50 patients with these symptoms underwent MRCP using 1.5 Tesla Siemens Symphony MRI scanner.
- The results were compared with ERCP.

EXCLUSION CRITERIA

- Pts with claustrophobia,
- Pts with cardiac pacemakers,
- Pts with metallic implants,

  Hemodynamically unstable patients.

MRCP SEQUENCES

T2 Haste

HASTE thick slab

HASTE thin slice

TRUFI Axial and Coronal

CAUSES OF BILIARY OBSTRUCTION

In our study causes of biliary obstruction was divided into five major types.

1) Calculus-Gallbladder calculus, Common bileduct calculus

2) Stricture- Benign stricture due to post cholecystectomy, Malignant stricture due to Klatskin tumour, sclerosing cholangitis

3) Tumour- Gallbladder ca, Pancreatic ca, Periampullary ca, Cholangioca

4) Choledochal cyst

5) Extrinsic causes –Chronic pancreatitis, Mirizzi's syndrome, Pseudocyst of pancreas

STATISTICAL ANALYSIS

Data was analysed using Statistical Package for the Social Science (SPSS) Version 16.00 for Windows. Descriptive (frequencies, Percentages, Mean and Standard Deviation) and inferential Statistics were used to analyze the data. The inferential statistics used included Chi square, analysis of Variance, correlation coefficient.

Continuous variables were presented as mean ± (SD). Continuous variables were compared through student independent t-test, Categorical variables by chi-square test was done where applicable. Sensitivity, specificity, PPV , NPV , Accuracy were also calculated in comparing diagnosis. For all statistical tests P <0.05 was considered as statistically significant.

RESULT AND ANALYSIS

The data were collected from a sample of 50 patients. this part deals with the analysis and interpretation of data collected.

The study subjects consisted of 28 male and 22 female patients, between the age of 24 to 60 years (with mean age of 43.56 ± 8.49 years).

THE DISTRIBUTION OF DEMOGRAPHICAL CHARACTERISTICS OF STUDY SAMPLE

Table-1: Gender Distribution

Gender	MRCP		ERCP	
	N	%	N	%
Male	28	56	28	56
Female	22	44	22	44
Total	50	100	50	100

From the above table-1, a total sample of 50 was used for analysis. Males comprised 28 (56 %) and female 22 (44 %) of the total 50 cases. Same subjects were included both MRCP and ERCP study. Majority of them were males.

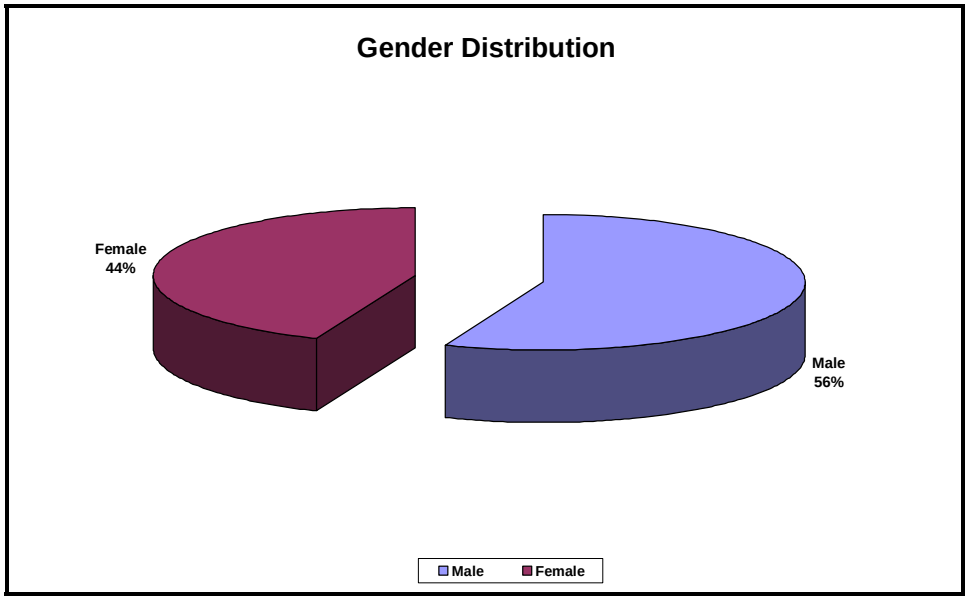


Table-2: Age distribution

Age Group (in Years)	Male		Female		Total	
	N	%	N	%	N	%
20 – 30	2	7.15	3	13.64	5	10.00
31 – 40	10	35.71	5	22.73	15	30.00
41 - 50	8	28.57	10	45.45	18	36.00
51 – 60	8	28.57	4	18.18	12	24.00
Total	28	100	22	100	50	100
	Chi Square= 2.74 p=0.43 Not Significant					

Table -2 reveals that distribution of the age group. 18 (36 %) are in the age group of 41–50 years, Irrespective of their sex. Further it reveals that 15 (30 %) of the patients belong to the age group of 31–40 years, 12 (24 %) of the patients belongs to the 51-60 years of the age group and 5 (10 %) are in the age group of 20-30 years. Using chi-square test, it showing that there is no significant difference between genders. (chi square =2.74 P >0.05).

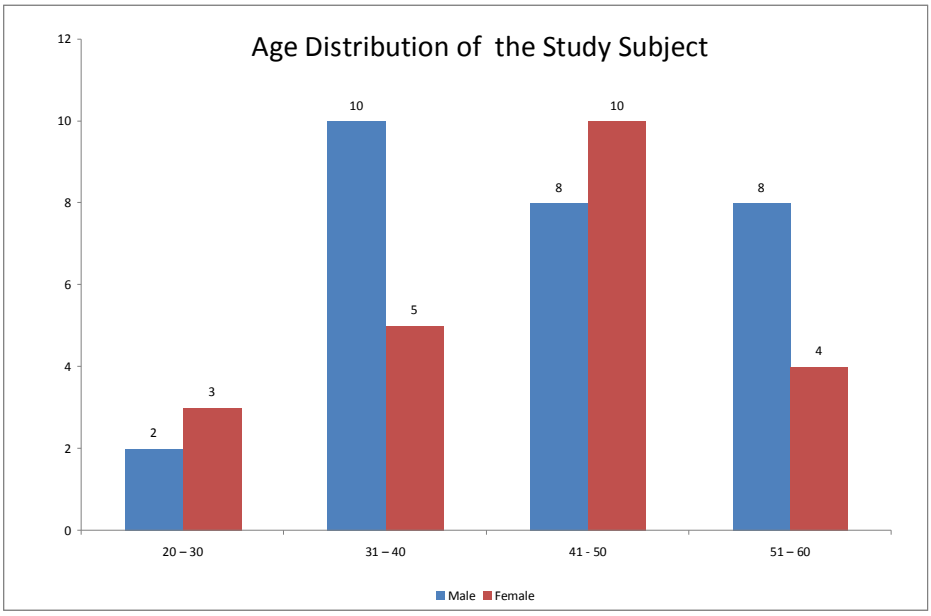


Table3: Mean Age

	Male	**Female**	**Total**
Mean	43.82	43.23	43.56
Standard Deviation (Sd)	7.92	9.35	8.49
	t-value = 0.243 p=0.809 Not Significant		

The mean age of the whole group was 43.56 ± 8.49. Males had mean age of (43.82 ± 7.92) and Females had mean age of 43.23 ± 9.35. There is no significant difference between the age of the male and female. (t=0.243 P >0.05).

Table-4: Clinical Presentation (Complaints)

Complaints	***Male***		***Female***		***Total***	
	N	***%***	***N***	***%***	***N***	***%***
Obstructive Jaundice	11	39.29	11	50.00	22	44.00
Pain Abdomen	10	35.71	11	50.00	21	42.00
Cholangitis	7	25.00	0	0	7	14.00
Total	**28**	**100**	**22**	**100**	**50**	**100**
	Chi Square= 6.42 df=2 p=0.04 Significant					

Table-4 shows that, 22 (44 %) had the complaints of the obstructive Jaundice, 21 (42 %) had Pain Abdomen and a small 7 (14 %) had Cholangitis. It is clear that the male and female patients differ with regards to their complaints (X2=6.42 , df =2, P < 0.04).

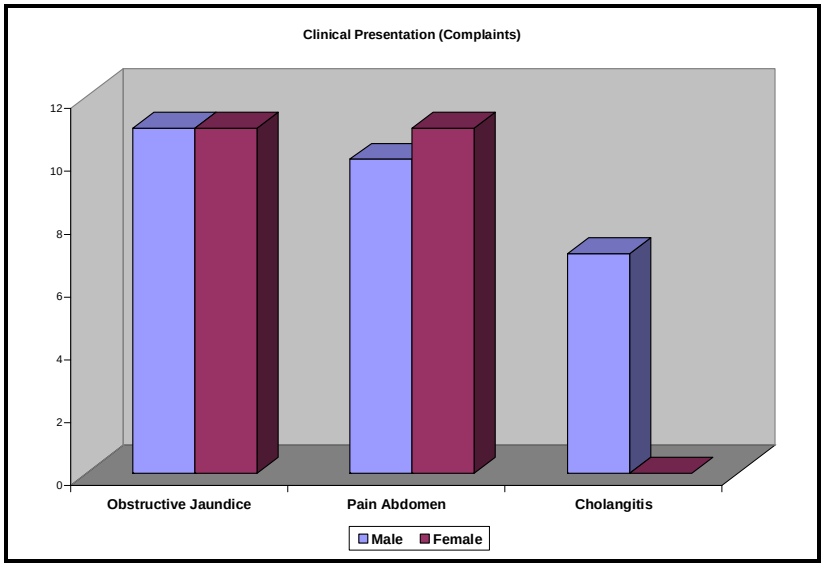


Table-5: MRCP based on Cause of obstruction

	Cause of Obstruction	Male		Female		Total	
		No.	**%**	**No.**	**%**	**No,**	**%**
1	BS-PC -Benign Stricture - Post Cholecystectomy	2	7.10	5	22.70	7	14.00
2	C-CA -Cholangio Carcinoma	0	0	1	4.50	1	2.00
3	CC -CBD Calculus	3	10.70	1	4.50	4	8.00
4	CH-P -Chronic Pancreatitis	3	10.70	0	0	3	6.00
5	Ch-Cy -Choledochal Cyst	2	7.10	3	13.60	5	10.00
6	G-CA -Gall Bladder Carcinoma	4	14.30	0	0	4	8.00
7	GC+CC -GB Calculus + CBD Calculus	2	7.10	0	0	2	4.00
8	MI-SY -Mirizzi syndrome	2	7.10	0	0	2	4.00
9	MS-KT -Malignant Stricture - Klatskin Tumour	1	3.60	5	22.70	6	12.00

	Cause of Obstruction	Male		Female		Total	
		No.	%	No.	%	No,	%
10	PA-CA - Pancreatic Carcinoma	2	7.10	0	0	2	4.00
11	PC- Periampullary carcinoma	3	10.70	3	13.60	6	12.00
12	PS-CH-Primary Sclerosing Cholangitis	1	3.60	1	3.60	2	4.00
13	Normal	3	10.70	3	13.60	6	12.00
Total		**28**	**100**	**22**	**100**	**50**	**100**

From the above table, Irrespective of of their sex 7 (14 %) are having Benign Stricture with Post Cholecystectomy,6 (14 %) are having Malignant stricture with Klatskin Tumour , 6 (14 %) are having Periampullary carcinoma, 5 (10 %) are having Choledochal Cyst, 4 (8 %) are having Gall Bladder Carcinoma, 3 (6 %) are having Chronic Pancreatitis, 2 (4%) are having GB Calculus with CBD Calculus, 2 (4 %) are having Mirizzi syndrome, 2 (4 %) are having Primary Sclerosing Cholangitis , 1 (2%) is having Cholangio Carcinoma and 6 (12.%) are not having any disease (Normal).

MRCP CAUSE OF OBSTRUCTION

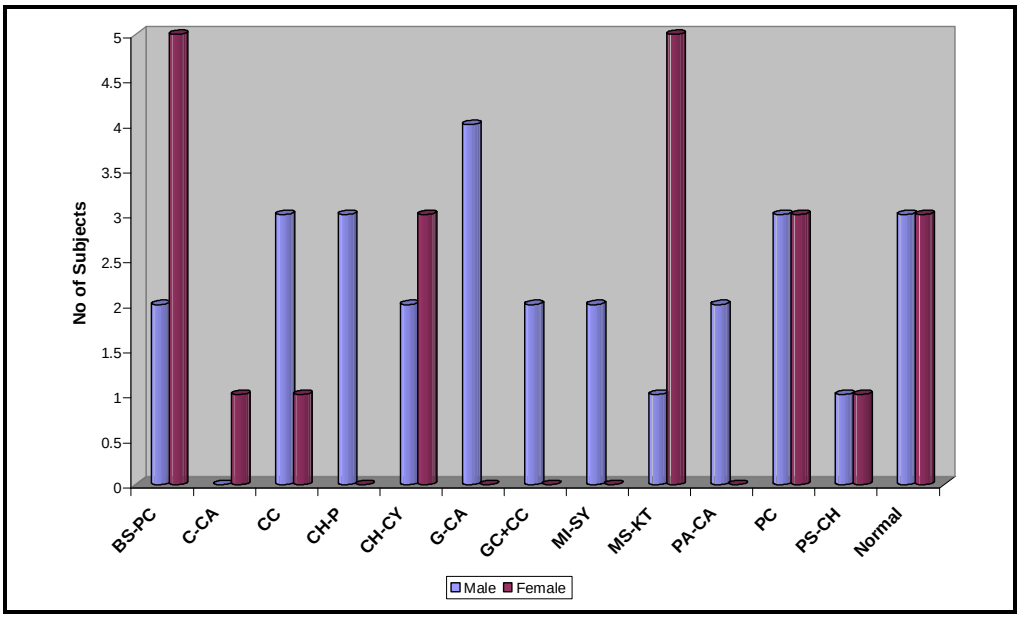


Table-6: MRCP – type of causes

Type of causes	*No.*	*%*
CALCULUS	6	12.00
STRICTURE	15	30.00
TUMORS	13	26.00
CYST	5	10.00
EXTRINSIC CAUSES	5	10.00
Not Determined	6	12.00
Total	**50**	**100**

Table reveals that type of causes , 15 (30 %) was found to be Stricture, 13 (26 %) was found to be Tumors, Calculus found in 6 (12 %), Cyst and Extrinsic Causes are having each 5 (10%) and 6 (10 %) was found not having any disease (Not Determined).

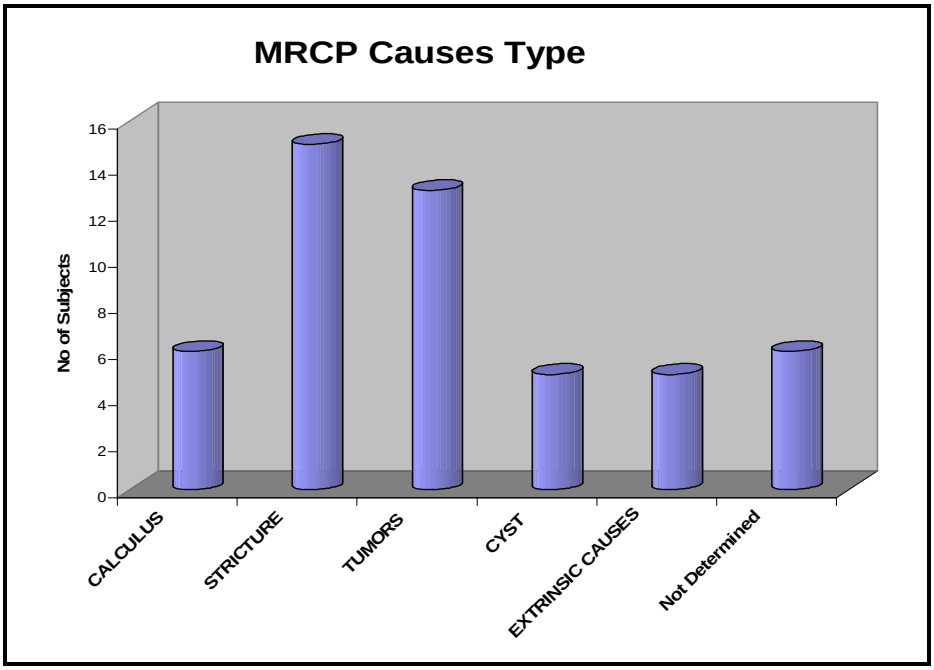


Table -7: MRCP in Extent of Obstruction

Obstruct	N	%
Determined	44	88.00
Not Determined	6	12.00
Total	**50**	**100**

The above table reveals that extent of obstruction determined by MRCP. 44 (98 %) are determined and remaining very few 6 (12 %) cases are not determined by MRCP. So most of the cases were determined by MRCP.

MRCP Extent of Obstruction

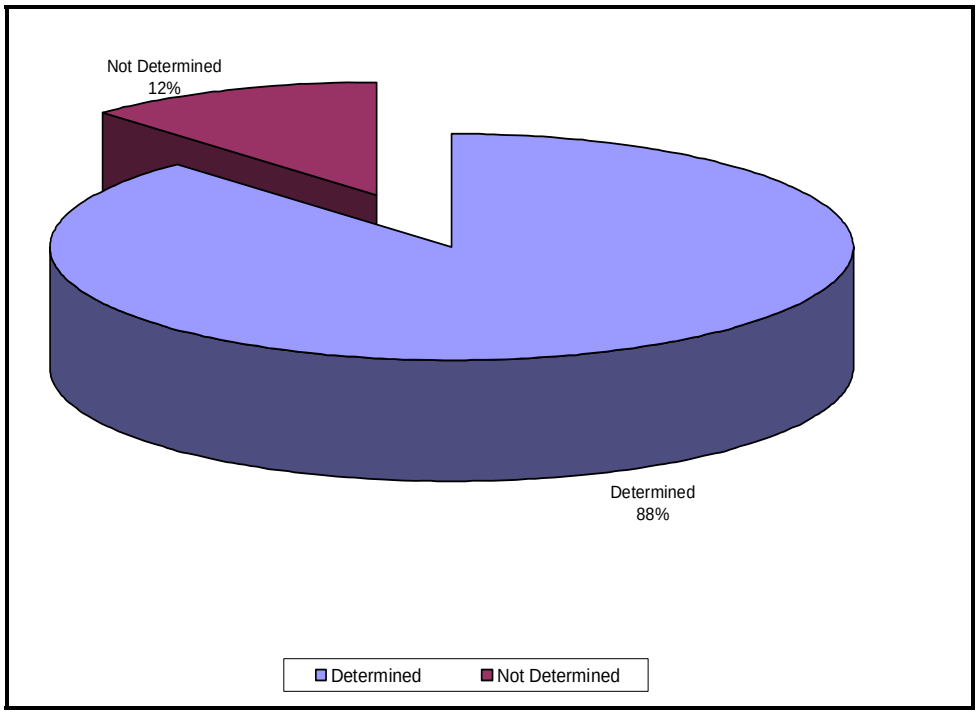


Table 8: ERCP based on Cause of obstruction

S . No.	Cause of Obstruction	Male		Female		Total	
		No.	%	No.	%	N	%
1	BS-PC -Benign Stricture - Post Cholecystectomy	2	7.10	4	18.20	6	12.00
2	C-CA -Cholangio Carcinoma	-	-	1	4.50	1	2.00
3	CC -CBD Calculus	4	14.30	2	9.10	6	12.00
4	CH-P- Chronic Pancreatitis	3	10.70	0	0	3	6.00
5	Ch-Cy -Choledochal Cyst	2	7.10	3	13.60	5	10.00
6	G-CA -GalL Bladder Carcinoma	4	14.30	-	-	4	8.00
7	GC-CC -GB Calculus + CBD Calculus	2	7.10	0	-	2	4.00
8	MI-SY -Mirizzi syndrome	2	7.10	0	-	2	4.00
9	MS-KT -Malignant Stricture - Klatskin Tumour	1	3.60	5	22.70	8	16.00
10	PA-CA - Pancreatic Carcinoma	2	10.71	-	-	2	4.00
11	PC - Periampullary carcinoma	3	10.71	2	9.10	5	10.00

S . No.	Cause of Obstruction	Male		Female		Total	
		No.	%	No.	%	N	%
12	PS-CH -Primary Sclerosing Cholangitis	0	-	1	4.55	1	2.00
13	Normal	3	10.70	4	18.20	7	14.0
Total		**28**	**100.00**	**22**	**100.00**	**50**	**100.00**

From the above table, Irrespective of their sex 8 (16 %) are having Malignant stricture due to Klatskin Tumour , 6 (12 %) are having Benign Stricture due to Post Cholecystectomy sequelae, 6 (12 %) are having CBD calculus, 5 (10 %) are having Choledochal Cyst, 5 (10 %) Periampullary carcinoma,4 (8%) Gall Bladder Carcinoma, 3 (6%) Chronic Pancreatitis, 2 (4 %) GB Calculus + CBD Calculus, 2 (4%) Mirizzi syndrome, 2 (4 %) Pancreatic Carcinoma, 1 (2 %) Primary Sclerosing Cholangitis and 7 (14 %) were free from disease.

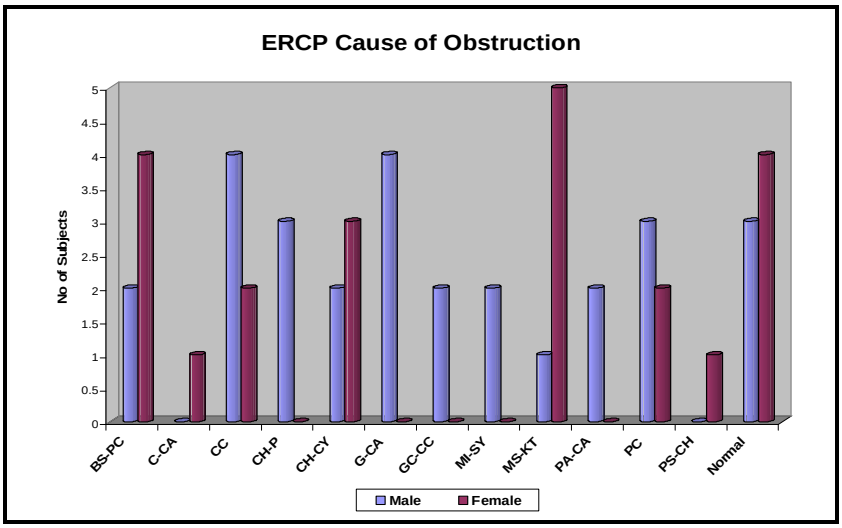


Table-9: ERCP in Cause of obstruction

Type of causes	No.	%
CALCULUS	8	16.00
STRICTURE	13	26.00
TUMORS	12	24.00
CYST	5	10.00
EXTRINSIC CAUSES	5	10.00
Not Determined	7	14.00
Total	**50**	**100**

The above table reveals that ERCP was able to detect Calculus in 8 (16 %) cases, Stricture in 13 (26%) cases, Tumors in 12 (24 %) cases, Cyst in 5 (10 %) cases, Extrinsic Causes in 5 (10 %) cases and 7 (14 %) were free from disease.

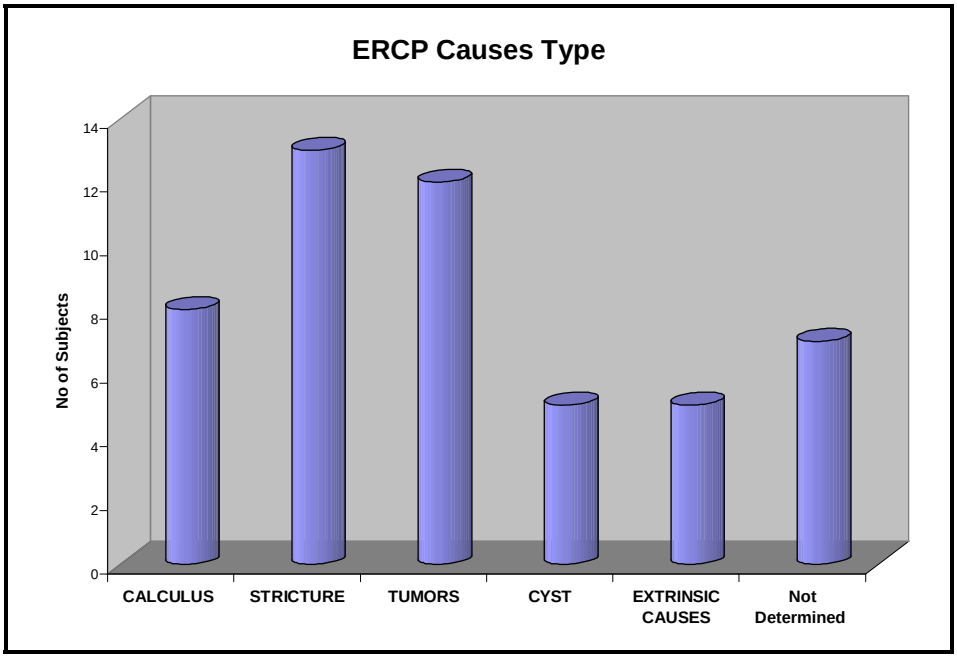


Table-10: ERCP in Extent of Obstruction

Obstruction	N	%
Determined	36	72
Not Determined	14	28
Total	**50**	**100**

The above Table-10 Reveals that extent of obstruction determined by ERCP was 36 cases (72 %) and remaining 14 (28%) are not determined by ERCP.

ERCP Extent of Obstruction

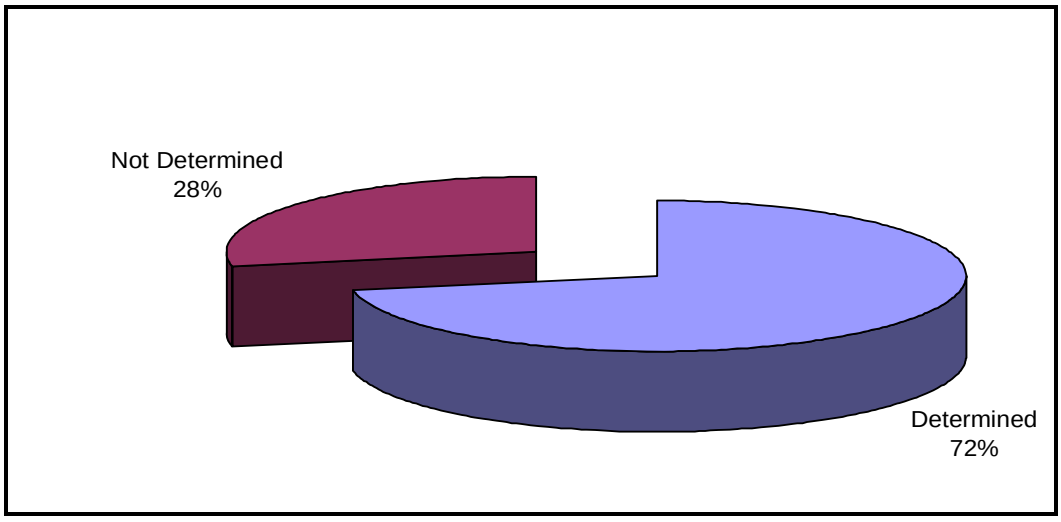


Table-11: Per Operative Findings

	Cause of Obstruction	***Male***		***Female***		***Total***	
		No.	***%***	***No.***	***%***	***No,***	***%***
1	BS-PC -Benign Stricture - Post Cholecystectomy	2	7.10	4	18.20	6	12.00
2	C-CA -Cholangio Carcinoma	0	0	1	4.50	1	2.00
3	CC -CBD Calculus	3	10.70	1	4.50	4	8.00
4	CH-P – Chronic Pancreatitis	3	10.70	0	0.00	3	6.00
5	Ch-Cy -Choledochal Cyst	2	7.10	3	13.60	5	10.00
6	G-CA -Gall Bladder Carcinoma	4	14.30	0	0	4	8.00
7	GC+CC -GB Calculus + CBD Calculus	2	7.10	0	0	2	4.00
8	MI-SY -Mirizzi syndrome	2	7.10	0	0	2	4.00
9	MS-KT -Malignant Stricture - Klatskin Tumour	2	7.10	5	22.70	7	14.00
10	PA-CA - Pancreatic Carcinoma	2	10.70	0	-	2	4.00
11	PC - Periampullary carcinoma	3	10.70	3	13.60	6	12.00
12	PS-CH -Primary Sclerosing Cholaigitis	1	3.60	1	4.50	2	4.00
13	Normal	2	7.10	4	18.20	6	24.00

	Cause of Obstruction	Male		Female		Total	
		No.	%	No.	%	No,	%
	Total	28	100	22	100	50	100

From the above table shows per operative findings , Irrespective of of their sex 7 (14 %) are having Malignant stricture with Klatskin Tumour , 6 (12 %) are having Benign Stricture due to Post Cholecystectomy, 6 (12 %) are having Periampullary carcinoma, 5 (10 %) are having Choledochal Cyst, 4 (8 %) are having Gall Bladder Carcinoma, 3 (6 %) are having Chronic Pancreatitis, 2 (4 %) are having GB Calculus + CBD Calculus, 2 (4 %) are having Mirizzi syndrome, 2 (4 %) are having Pancreatic Carcinoma, 1 (2%) is having Cholangio Carcinoma and 6 (12 %) free from disease (Normal).

Peroperative Cause of Obstruction

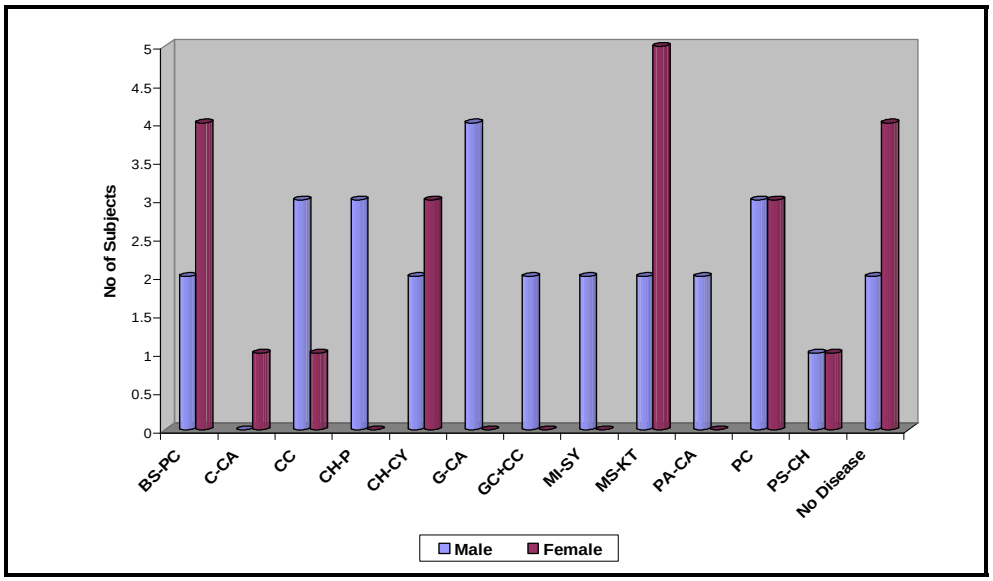


Table-12: Per Operative determination.

TYPE	TOTAL
CALCULUS	6
STRICTURE	15
TUMORS	13
CYST	5
EXTRINSIC CAUSES	5
Non Diseased	6
TOTAL	**50**

The above table reveals that Operative findings confirmed Calculus in 6 (12 %) cases, Stricture in 15 (30%) cases, Tumors in 13 (26 %) cases, Cyst in 5 (10 %) cases, Extrinsic Causes in 5 (10 %) cases and 6 (12 %) were free from disease.

Table-13: Per Operative Extent of Obstruction

Obstruction	N	%
Diseased	44	88
Non Diseased	06	12
Total	**50**	**100**

The above Table-13 Reveals that extent of obstruction determined in per Operative findings. 44 cases (88 %) are having Disease and remaining 6 (12%) are not having disease.

Peroperative extent of obstruction

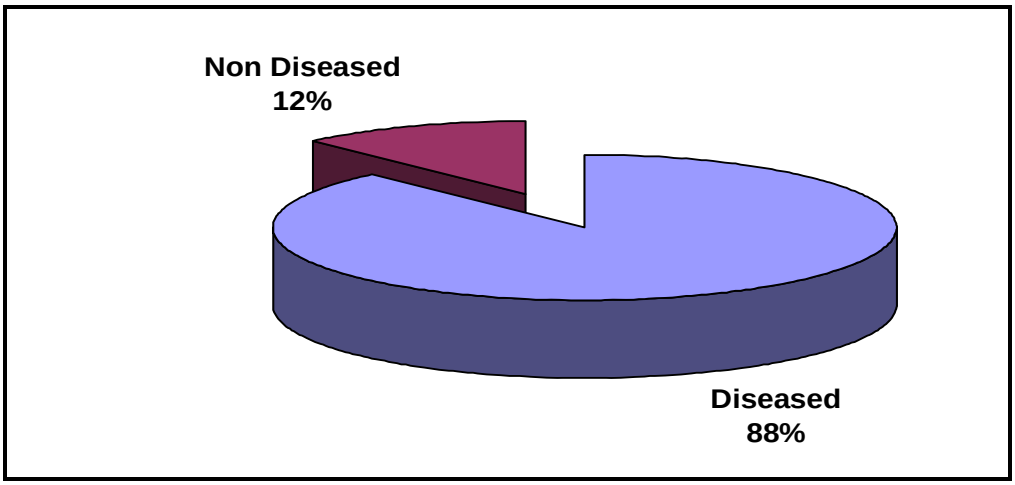


Table-14: MRCP – Cause Vs Extent of obstruction

Sl No.	Cause	Obstruction		Total
		Determined	Not Determined	
1	BS-PC- Benign Stricture - Post Cholecystectomy	7	0	7
2	C-CA- Cholangio Carcinoma	1	0	1
3	CC – CBD Calculus	4	0	4
4	Ch-Cy Choledochal Cyst	5	0	5
5	CH-P – Chronic Pancreatitis	3	0	3
6	G-CA- Gall Bladder + Carcinoma	4	0	4
7	GC+CC- GB Calculus + CBD Calculus	2	0	2
8	MI-SY- Mirizzi syndrome	2	0	2
9	MS-KT- Malignant Stricture + Klatskin Tumour	6	1	7
10	PA-CA- Pancreatic Carcinoma	2	0	2
11	PC – Periampullary carcinoma	6	0	6
12	PS-CH- Primary Sclerosing +Cholangitis	2	0	3
13	Normal	0	5	5

Sl No.	Cause	Obstruction		Total
		Determined	Not Determined	
TOTAL		44	6	50

Table shows that MRCP detected obstruction in 44 (88 %) cases but failed in 6 (12 %) cases.

MRCP Cause Vs Extent of Obstruction

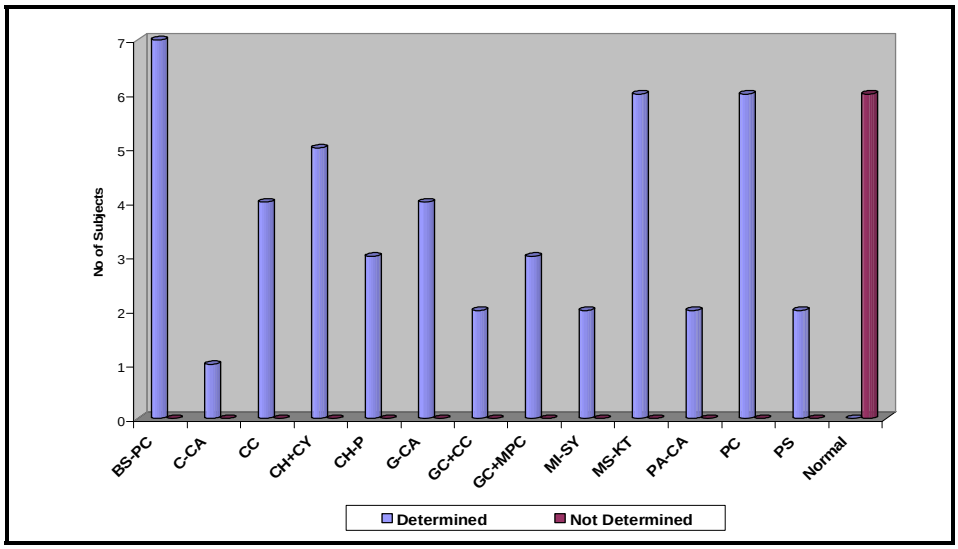


Table-15: ERCP – Cause Vs Extent of Obstruction

	Causes	***Obstruction***		
		Determined	***Not Determined***	***Total***
1.	BS-PC- Benign Stricture + Post Cholecystectomy	6	0	6
2.	C-CA- Cholangio Carcinoma	1	0	1
3.	CC – CBD Calculus	6	0	6
4.	CH-P – Chronic Pancreatitis	3	0	3
5.	Ch-Cy Choledochal Cyst	0	5	5
6.	G-CA- Gall Bladder Carcinoma	4	0	4
7.	GC+CC- GB Calculus + CBD Calculus	2	0	2
8.	MI-SY- Mirizzi syndrome	0	2	2
9.	MS-KT-Malignant Stricture - Klatskin Tumour	6	1	7
10.	PA-CA- Pancreatic Carcinoma	2	0	2
11.	PC – Periampullary carcinoma	5	0	5
12.	PS-CH- Primary SclerosingCholangitis	1	0	1
13.	Normal	0	6	6
Total		**36**	**14**	**50**

Table shows that ERCP was not able to detect 14 (28 %) cases but correctly detect 36 (72 %) cases. Among not able to detect cases 5 were (10 %) Choledochal Cyst , 2 (4 %) Mirizzi syndrome and 7 (14 %) Normal cases.

Table-16: Comparison between MRCP and ERCP in Cause of obstruction vs Extent of obstruction.

S No	Per Operative Findings	N	Determined		Not Determined	
			MRCP	ERCP	MRCP	ERCP
1	BS-PC- Benign Stricture - Post Cholecystectomy	6	6	6	0	0
2	C-CA- Cholangio Carcinoma	1	1	1	0	0
3	CC – CBD Calculus	4	4	4	0	0
4	CH-P – Chronic Pancreatitis	3	3	3	0	0
5	Ch-Cy- Choledochal Cyst	5	5	0	0	5
6	G-CA- Gall Bladder Carcinoma	4	4	4	0	0
7	GC+CC-GB Calculus + CBD Calculus	2	2	2	0	0
8	MI-SY- Mirizzi syndrome	2	2	0	0	2
9	MS-KT- Malignant Stricture - Klatskin Tumour	7	6	6	1	1
10	PA-CA- Pancreatic Carcinoma	2	2	2	0	0
11	PC – Periampullary carcinoma	6	6	5	0	1
12	PS-CH- Primary SclerosingCholangitis	2	2	1	0	1
13	Normal	6	1	2	5	4
Total		**50**	**44**	**36**	**6**	**14**

Both MRCP and ERCP failed to detect some cases. They are

Malignant Stricture - Klatskin Tumour and Normal cases.

MRCP failed to detect 1 (2 %) Malignant Stricture - Klatskin Tumour and 5 (10 %) normal cases. But ERCP failed to detect 5 (10 %) cases of Choledochal Cyst, 2 (4 %) Mirizzi syndrome, 1 (2 %) Malignant Stricture - Klatskin Tumour, 1 (2 %) in Periampullary , 1 (2%) in Primary Sclerosing Cholangitis and 4 (8 %) cases as normal.

In contrast to MRCP, ERCP fails to detect 14 cases.

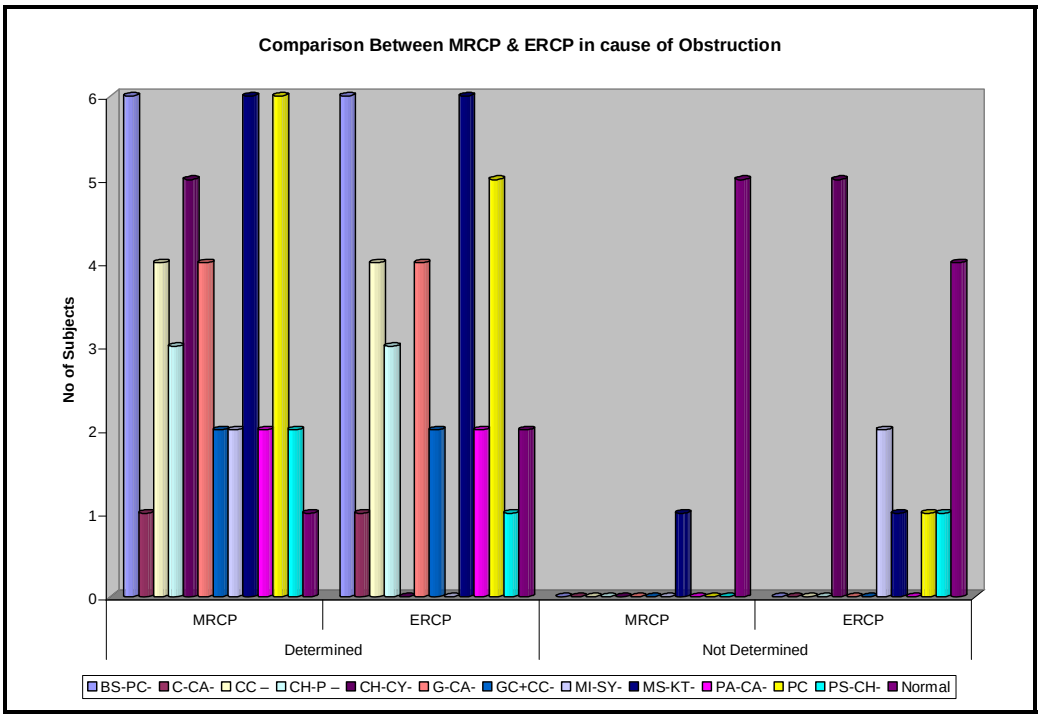


Table-17: Comparison between MRCP and ERCP in Determining the Extent of obstruction by Type of Causes

Per Operative Findings Type	***N***	***Determined***		***Not Determined***	
		MRCP	***ERCP***	***MRCP***	***ERCP***
CALCULUS	6	6	6	0	0
STRICTURE	15	14	13	1	2
TUMORS	13	13	12	0	1
CYST	5	5	0	0	5
EXTRINSIC CAUSES	5	5	3	0	2
Non Disease	6	1	2	5	4
Total	**50**	**44**	**36**	**6**	**14**

Both MRCP and ERCP were fails to detect some type of causes. They are 2 % cases of stricture and 10% cases of normal in MRCP..ERCP has failed in detecting cases in all most all the type expect Calculus.

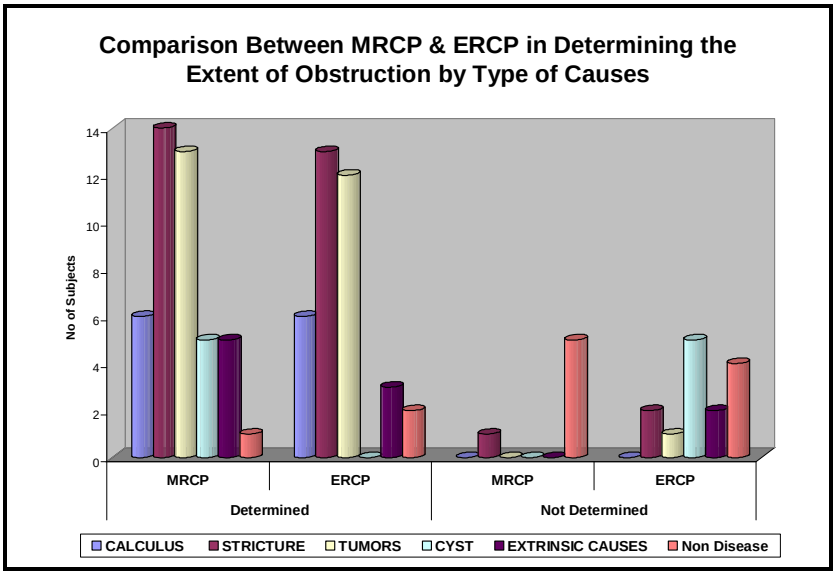


Table-18: Sensitivity of MRCP with peroperative findings

MRCP	***Per Operative Findings***		***Total***
	Disease Present	***Disease absent***	
Test Positive (Determined)	43	1	44
Test Negative (Not Determined)	1	5	6
TOTAL	**44**	**6**	**50**

Sensitivity = 97.73 %

Specificity = 83.33 %

Positive Predictive Value (PPV) = 97.73 %

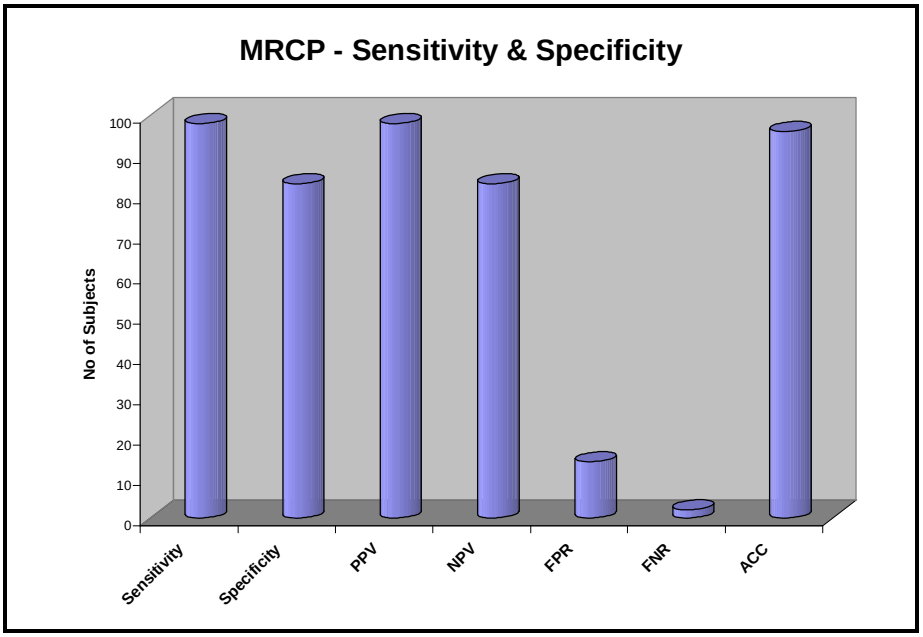
Negative Predictive Value (NPV) = 83.33 %

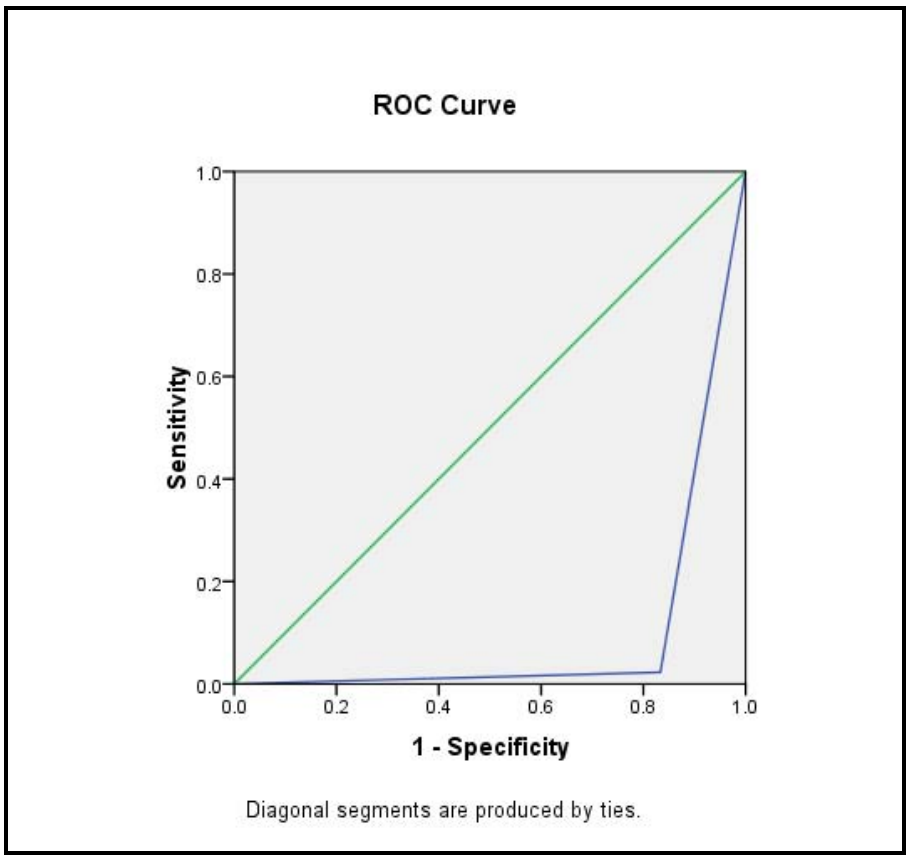
False Positive Rate (FPR) = 14.29 %

False Negative Rate (FNR) = 2.27 %

Accuracy (ACC) = 96 %

MRCP is detecting 97.73 % of positive cases and 83 .33 % negative cases were correctly detecting.





a. Under the nonparametric assumption

b. Null hypothesis: true area = 0.5

CO-ORDINATES OF THE CURVE

Test Result Variable(s):MRCP - Extent of Obstruction

Positive if Greater Than or Equal To[a]	Sensitivity	1 - Specificity
.00	1.000	1.000
1.50	.023	.833
3.00	.000	.000

The test result variable(s): MRCP - Extent of Obstruction has at least one tie between the positive actual state group and the negative actual state group.

a. The smallest cutoff value is the minimum observed test value minus 1, and the largest cutoff value is the maximum observed test value plus 1. All the other cutoff values are the averages of two consecutive ordered observed test values.

Table -19: Sensitivity of ERCP with per Operative Findings

ERCP	Per Operative Findings		Total
	Disease Present	Disease Absent	
Determined	34	2	36
Not Determined	10	4	14
TOTAL	44	6	50

Sensitivity = 77.27%

Specificity = 66.67 %

Positive Predictive Value (PPV) = 97.44 %

Negative Predictive Value (NPV) = 28.57 %

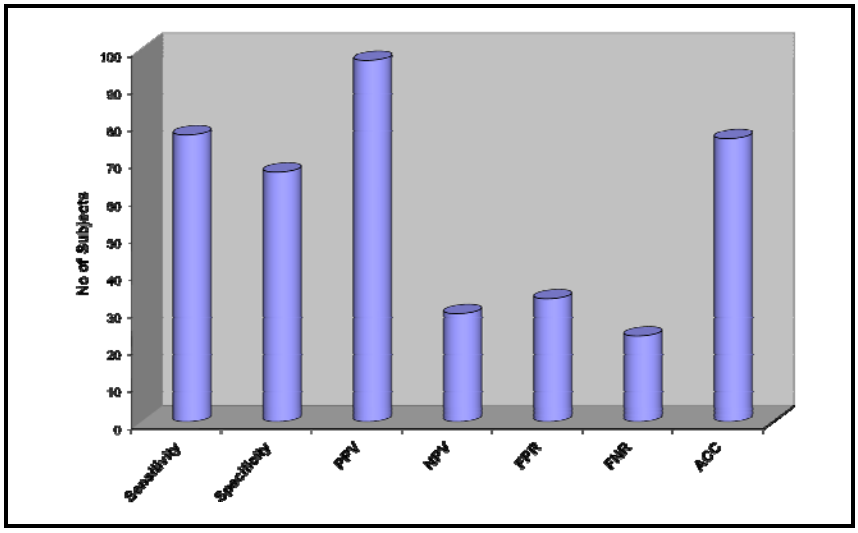
False Positive Rate (FPR) = 33.33%

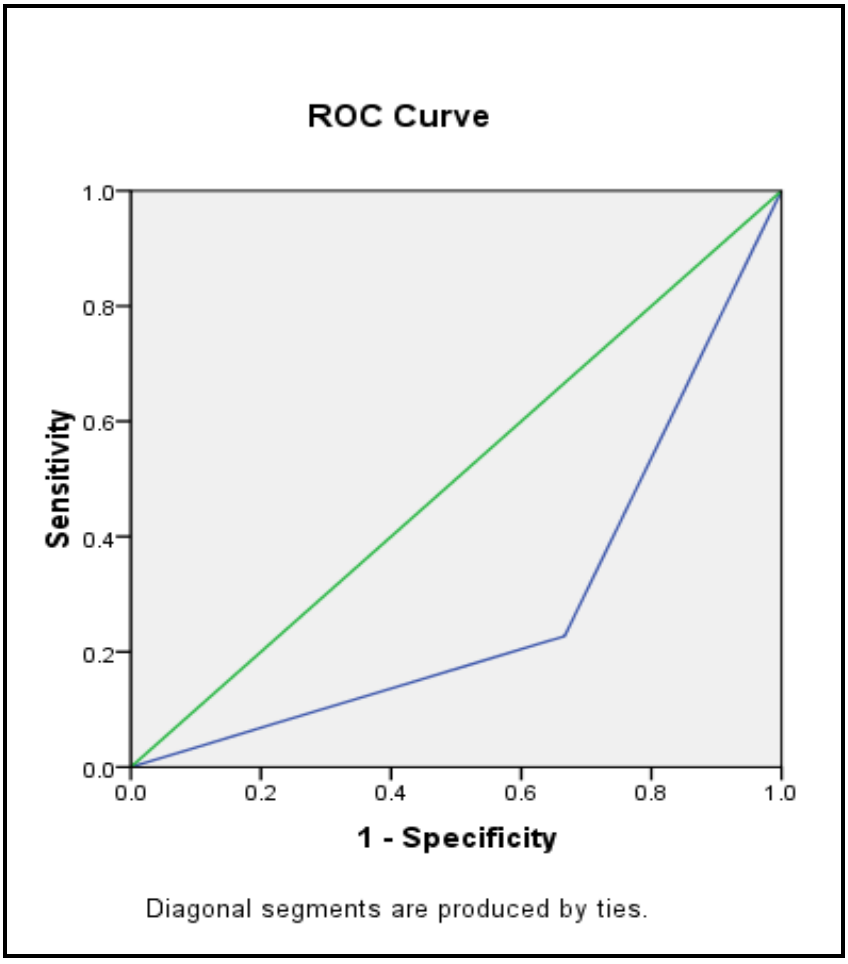
False Negative Rate (FNR) = 22.73%

Accuracy (ACC) (ACC) = 76 %

ERCP is detecting 77.27 % of positive cases and 66.67% negative cases are correctly detecting.

ERCP sensitivity and specificity





Area Under the Curve Test Result Variable(s):ERCP - Extent of Obstruction

Area	Std. Error[a]	Asymptotic Sig[b]	Asymptotic 95% Confidence Interval	
			Lower Bound	Upper Bound
.280	.119	.083	.048	.513

The test result variable(s): ERCP - Extent of Obstruction has at least one tie between the positive actual state group and the negative actual state group. Statistics may be biased.

a. Under the nonparametric assumption

b. Null hypothesis: true area = 0.5

Coordinates of the Curve Test Result Variable(s):ERCP - Extent of Obstruction

Positive if Greater Than or Equal To[a]	Sensitivity	1 - Specificity
.00	1.000	1.000
1.50	.227	.667
3.00	.000	.000

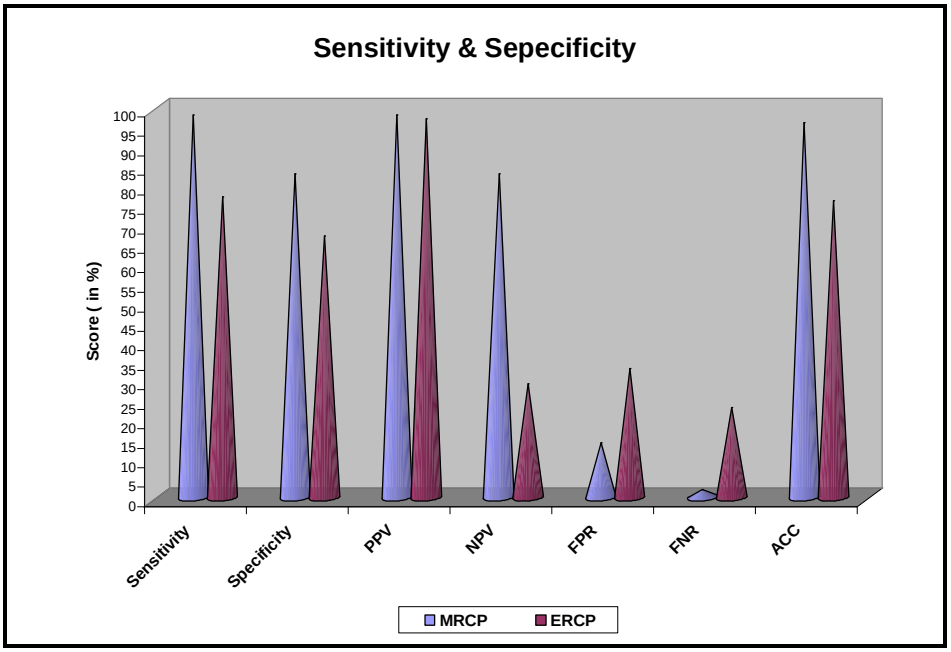
The test result variable(s): ERCP - Extent of Obstruction has at least one tie between the positive actual state group and the negative actual state group.

a. The smallest cutoff value is the minimum observed test value minus 1, and the largest cutoff value is the maximum observed test value plus 1. All the other cutoff values are the averages of two consecutive ordered observed test values.

Table-20

	MRCP	**ERCP**
Sensitivity	97.73 %	77.27 %
Specificity	83.33 %	66.67 %
Positive Predictive Value (PPV)	97.73 %	97.44 %
Negative Predictive Value (NPV)	83.33 %	28.57 %
False Positive Rate (FPR)	14.29 %	33.33 %
False Negative Rate (FNR)	2.27 %	22.73 %
Accuracy (ACC)	96.00 %	76.00 %

While comparing MRCP and ERCP all the values were higher then the ERCP values expect False Negative Rate (FNR). From that we can concluded that MRCP is clearly showing superior to ERCP in mapping out the extent of obstruction.



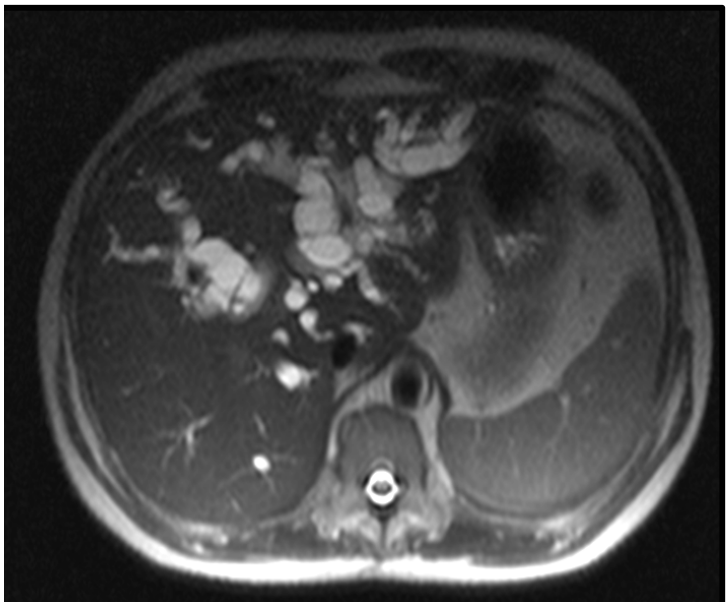
CASE 1-DISTAL CBD CALCULUS

TRUFI coronal image shows dilated bileduct with filling defect noted in distal CBD.

ERCP-DISTAL CBD CALCULUS

ERCP shows a filling defect at distal CBD

CASE2- PERIAMPULLARY CARCINOMA
T2 HASTE



TRUFI CORONAL

Figure shows IHBR dilatation.dilatedCBD.

CASE 3-DISTAL CBD STRICTURE

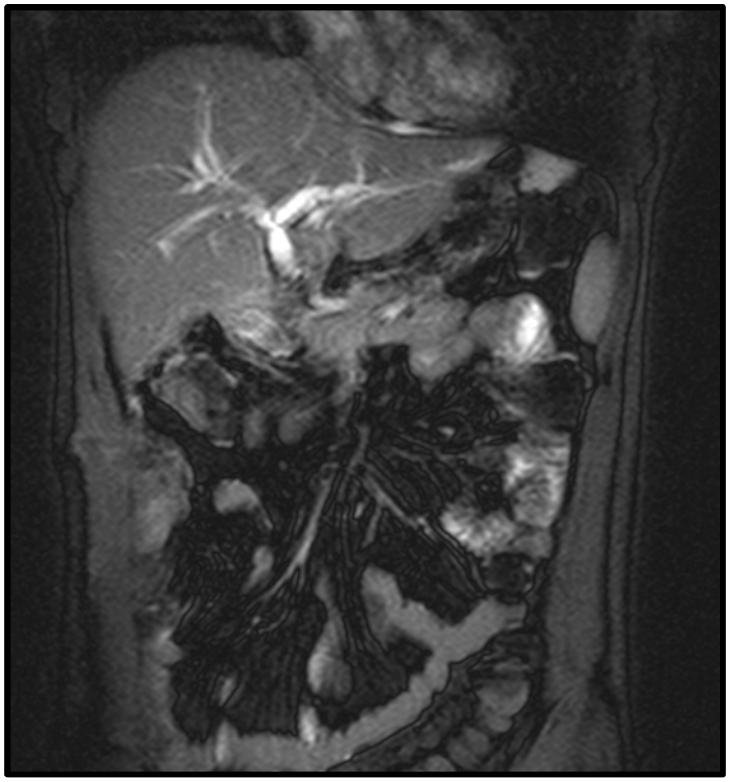
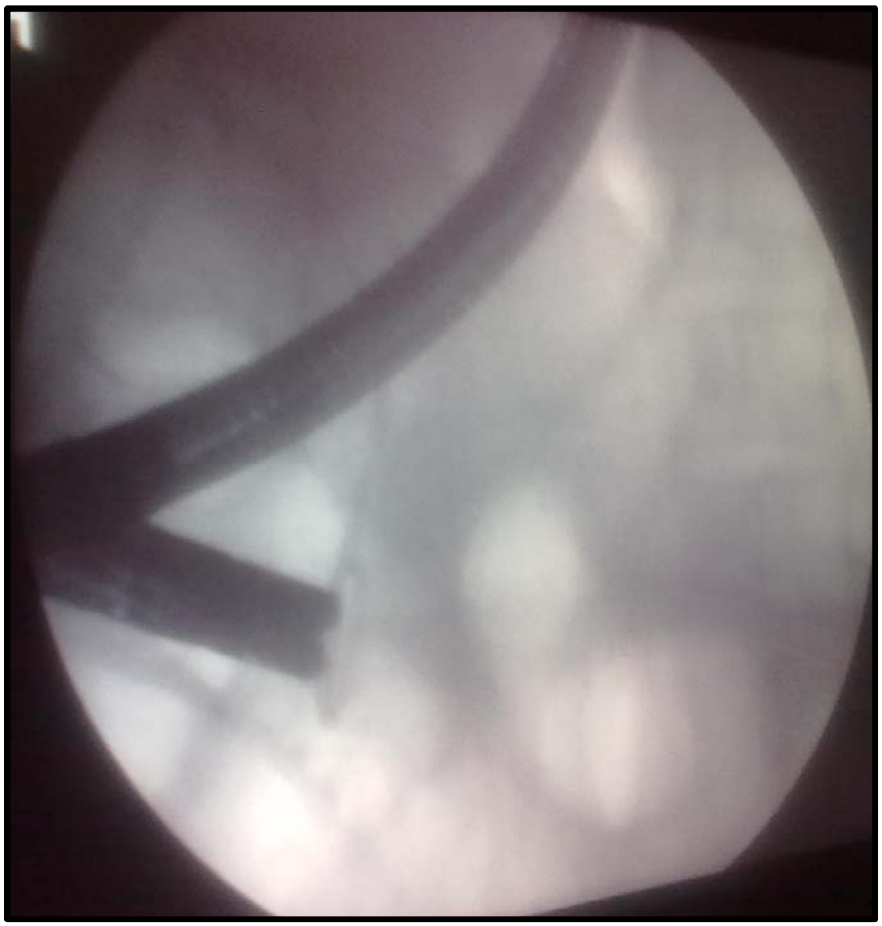


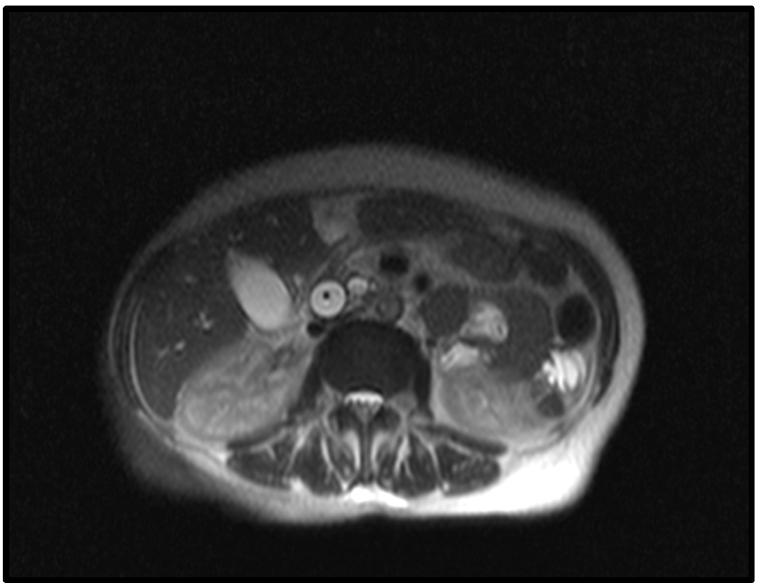
Figure shows dilated CBD with abrupt narrowing of terminal CBD.

ERCP-DISTAL CBD STRICTURE

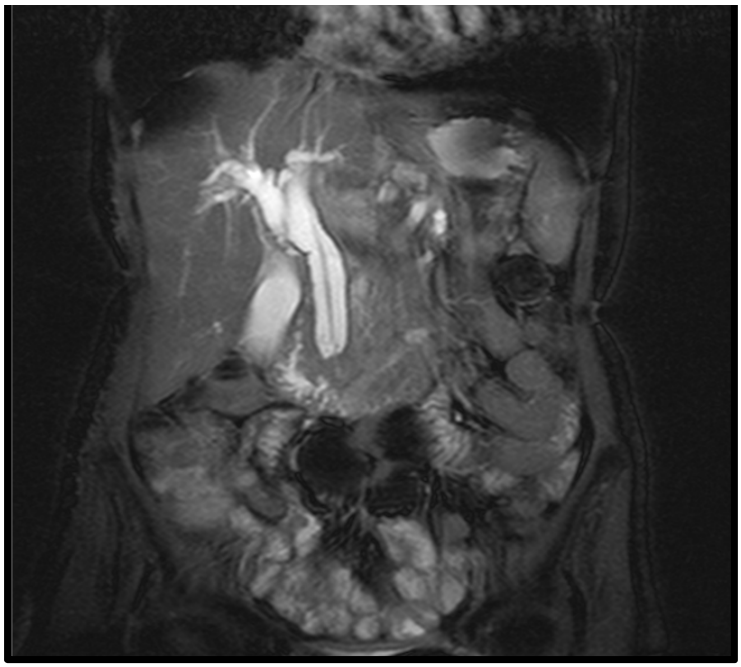


Due to the narrowing of terminal CBD the scope not passed beyond terminal CBD.

CASE4-DISTAL CBD GROWTH



T2 Haste



Trufi Coronal

Figure shows stent in CBD. Circumferential thickening of distal CBD noted.-BLOCKED STENT with Distal CBD growth

CASE 5-TYPE 1 CHOLEDOCHAL CYST

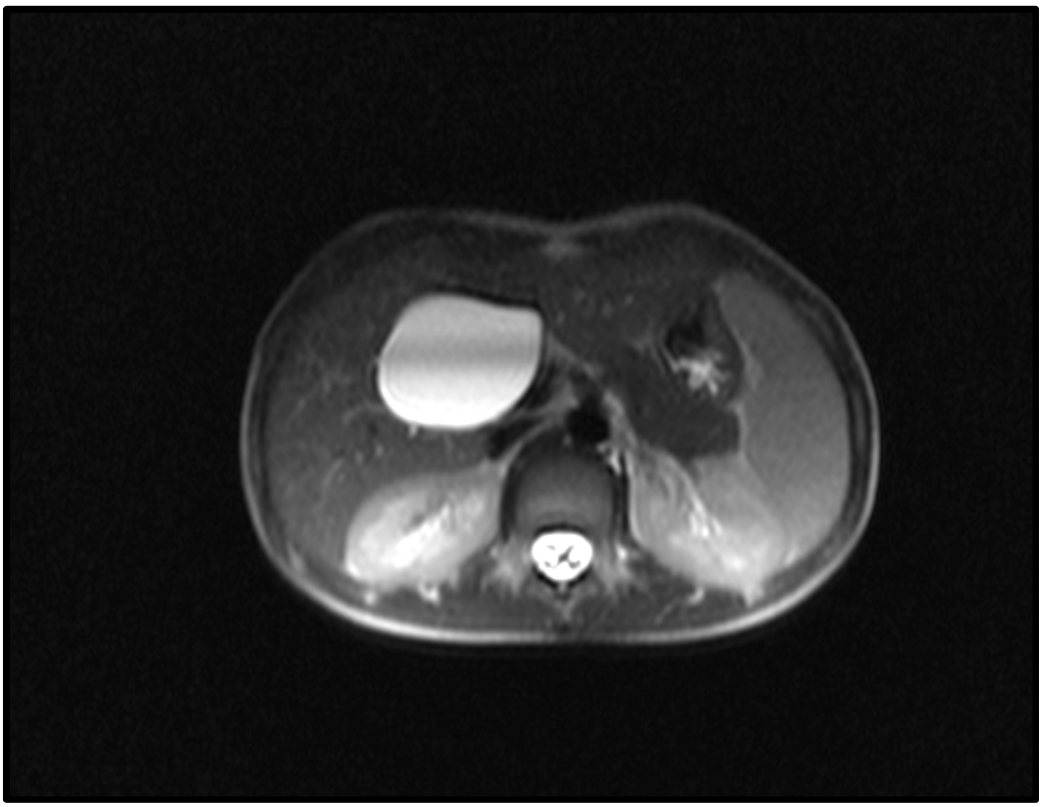
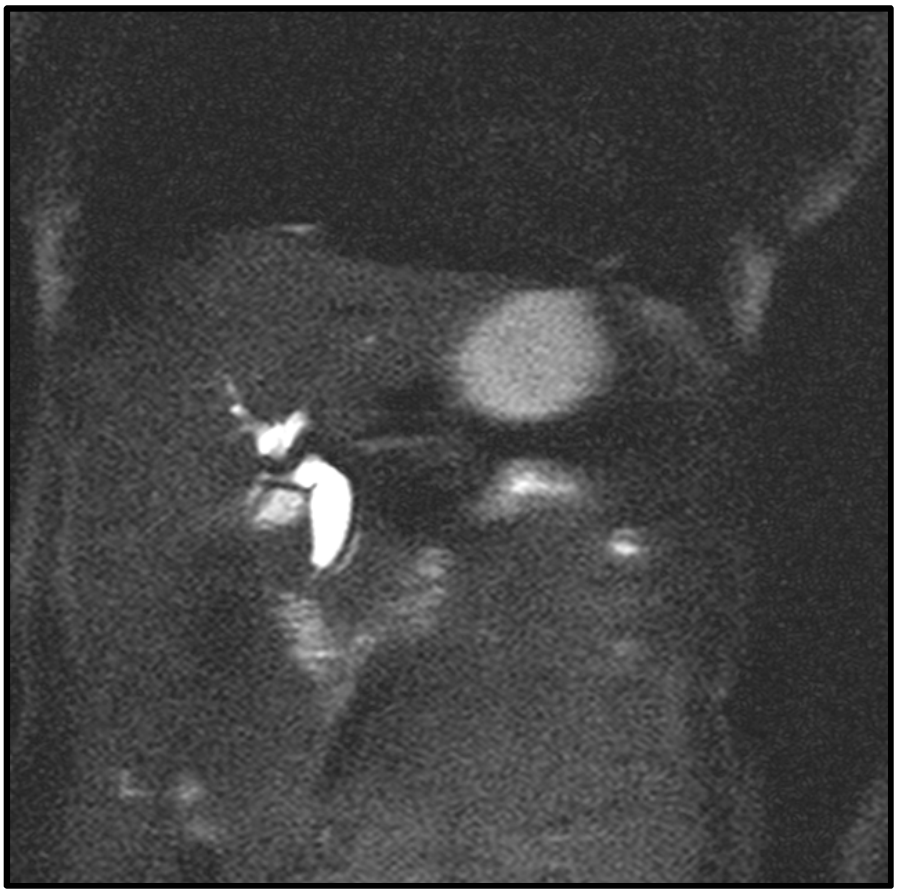


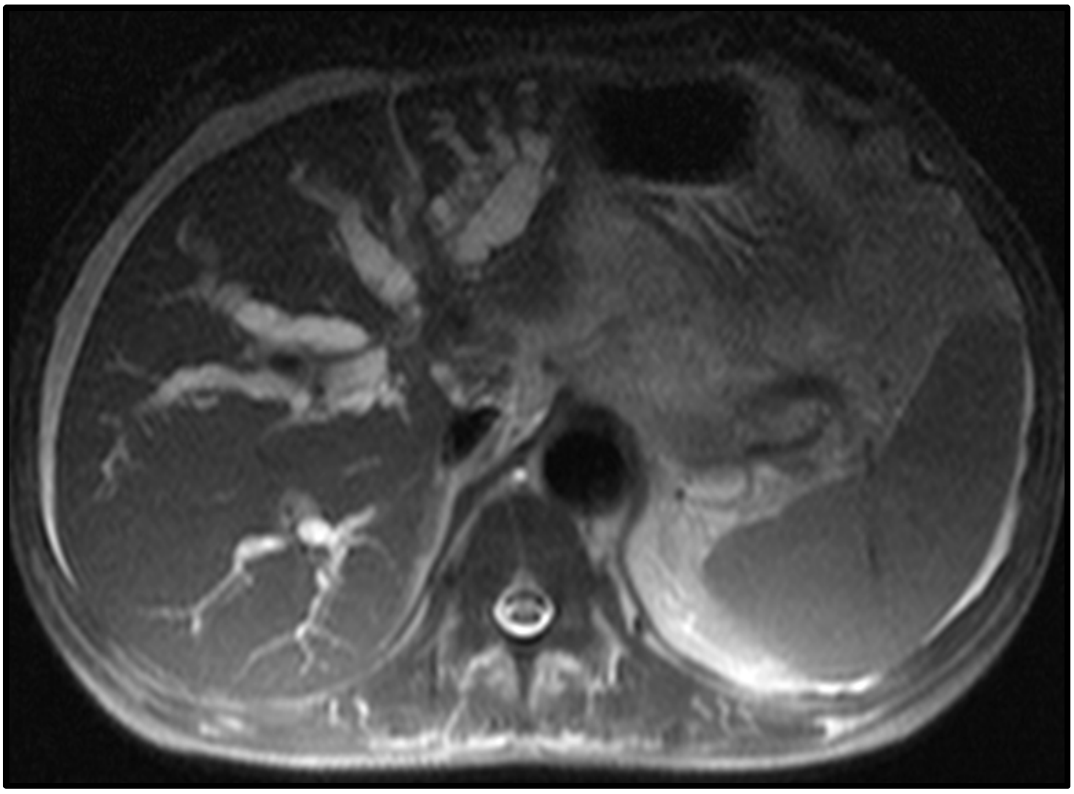
Figure shows Fusiform dilatation CBD noted

CASE 6-TYPE 4 CHOLEDOCHAL CYST



- Figure shows d ilatation of both intrahepatic and extrahepatic bileduct noted.
- Left hepatic duct and common bileduct appears dilated.
- Rt hepatic duct appears normal

CASE 7-KLATSKIN TUMOR



T2 image shows isointense lesion noted in the confluence of hepaticducts.CBD appears normal.

ERCP-KLATSKIN TUMOR

Filling defect noted in the hilum .normal appearing CBD.IHBR dilatation.

CASE 8-ACUTE ON CHRONIC PANCREATITIS

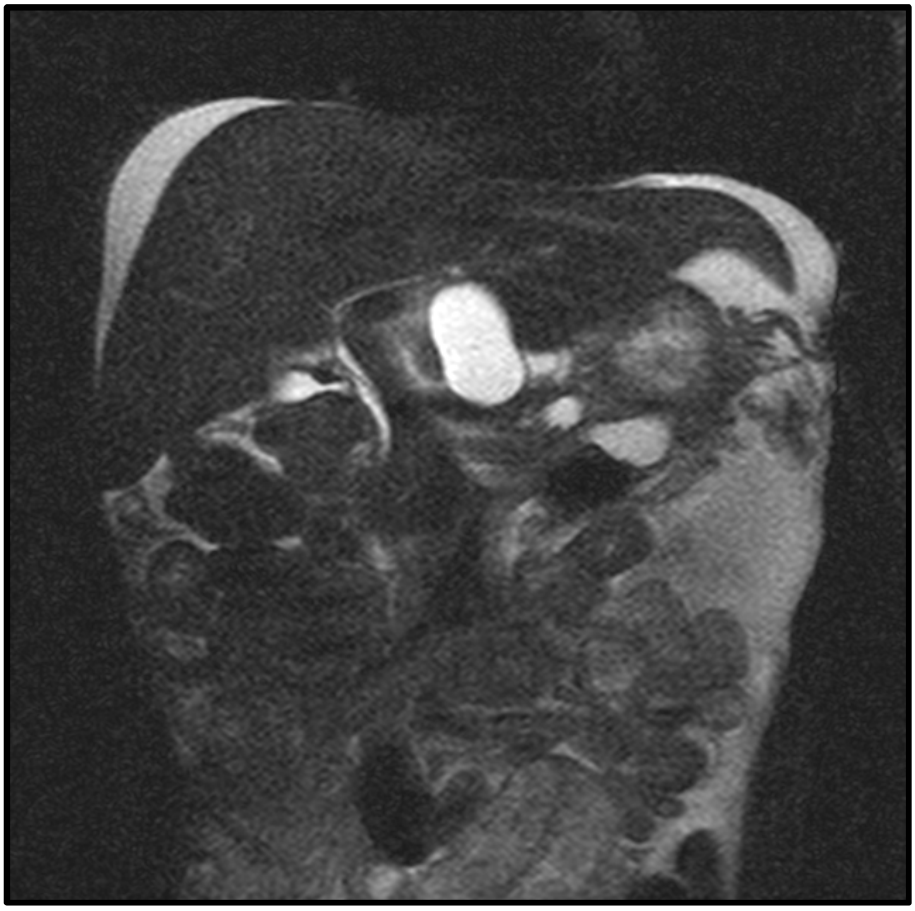
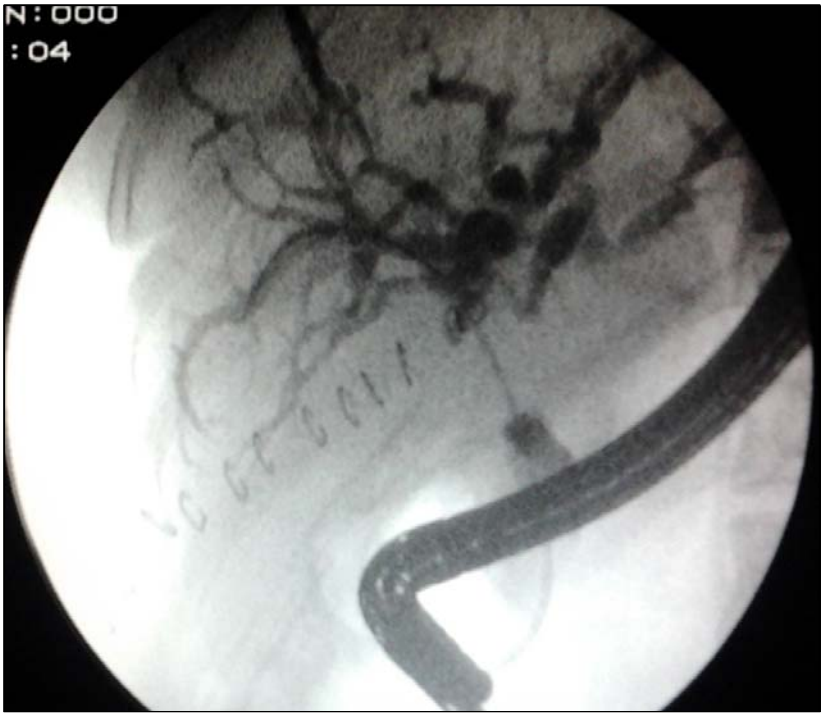


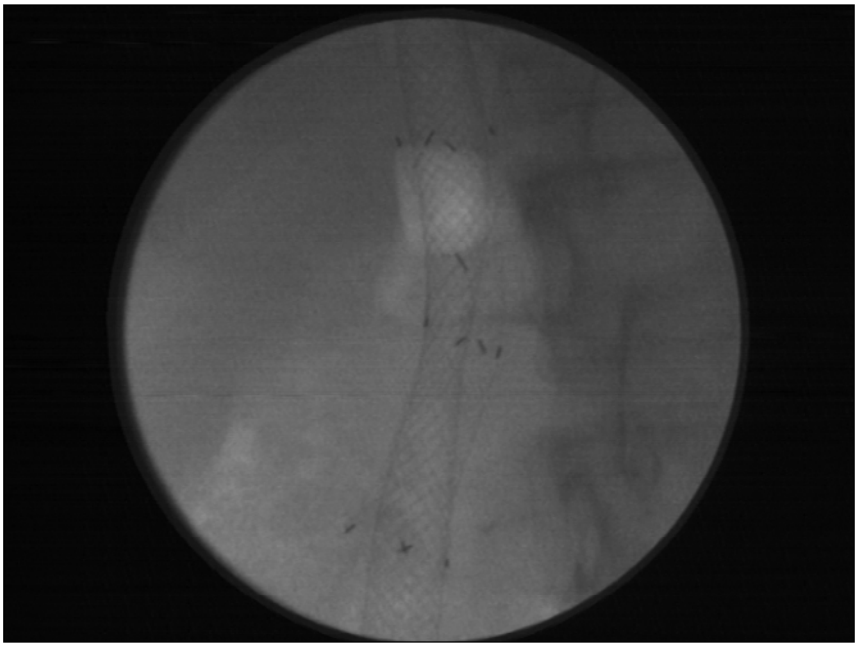
Figure shows Pseudo cyst, Pancreatic ascities, Duct disruption with Communication to cyst noted

CASE9-ERCP-SHORT SEGMENT STRICTURE



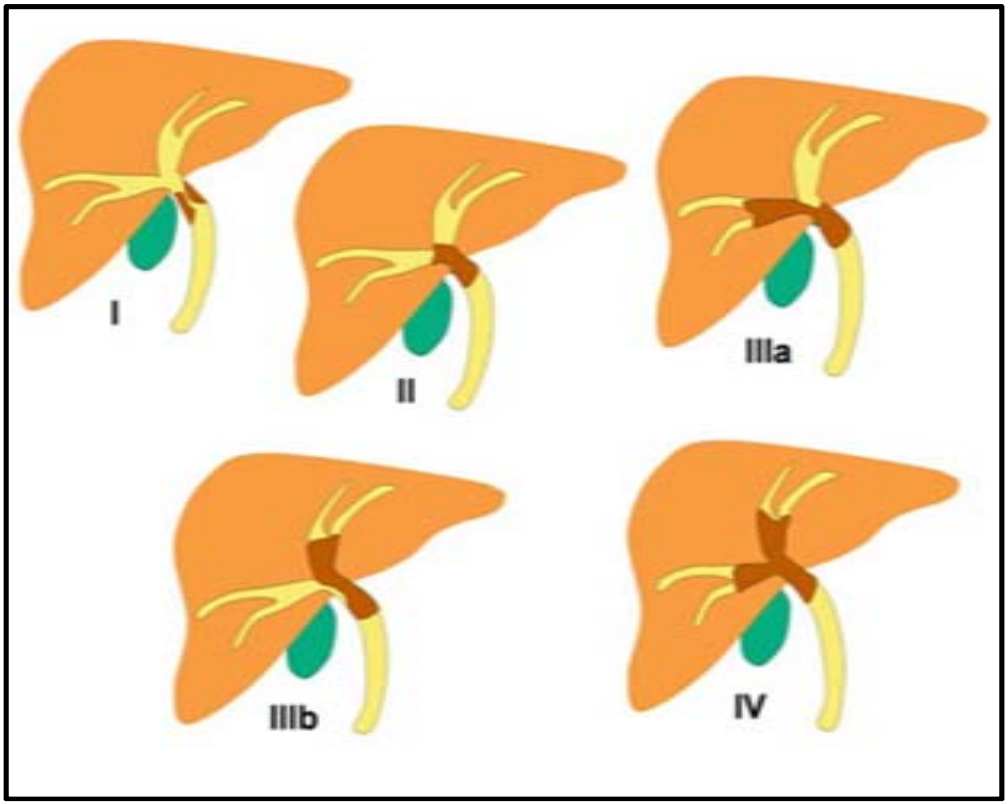
ERCP shows short segment stricture at the level of cystic duct after post cholecystectomy

CASE 10-ERCP PALLIATIVE STENT PLACEMENT



ERCP-Metallic stent placement in a case of inoperable periampullary growth

BISMUTH-CORLETTE CLASSIFICATION



Bismuth classification of malignant hilar biliary obstruction based on proximal extent of tumour

TODANI CLASSIFICATION OF CHOLECOCHAL CYST

Type		Description	Type		Description
I		Solitary fusiform extrahepatic	IVa		Fusiform and intrahepatic cysts
II		Extrahepatic supraduodenal diverticulum	IVb		Multiple extrahepatic cysts
III		Intraduodenal diverticulum; choledochocele	V		Multiple intrahepatic cysts; Caroli's Disease

DISCUSSION

Fifty evaluation of biliary patients – 28 males and 22 females were included in our study. A sizeable percentage (36 %) of the patients belongs to the age group 41 -50 years. Mean age of the whole group was 43.56 ± 8.49.

44 % with the complaints of Obstructive Jaundice followed by 42 % with Pain Abdomen and 14 % with Cholangitis. There is no significant difference between male and female. Highest 44 % of them had complaints of Obstructive Jaundice.

MRCP was able to detect Cause and type of Stricture in 30 % cases, Tumours in 26 % cases, Calculus in 12 % cases, 10 % in Extrinsic cases ,10 % of cases in Cyst cases and 12% cases of Non Disease cases, most of the obstructive jaundice cases were occurred from Stricture.

ERCP was able to detect Cause and type of Stricture in 26 % cases, Tumours in 24 % cases, Calculus cause in 6 % , Extrinsic causes in 10% cases, and 14 % of cases form non Disease cases. Most of the obstructive jaundice were occurred from Stricture.

Comparison of MRCP with ERCP based on Cause of Obstruction. MRCP was Determined Calclulus in 6 (12 %) cases and also ERCP was picked up 6 (12 %) cases. No cases were missed by both.. In Stricture MRCP has missed 1 (2 %) cases but ERCP has failed to Determined 2 (4 %) cases. ERCP has missed to diagnosis 1 tumor (2 %) cases, 5 cyst cases(10 %) and 2 cases of extrinsic causes(4 %) but MRCP was not missed such a cases.

One case of stricture due to klatskin tumour was not diagnosed by both MRCP and ERCP. The stricture was short segment one. It is due to periductal cause. One case of periampullary growth was missed by ERCP .It was a small non obstructive growth of terminal CBD at the level of periampullary region.It was also predominantly an extraluminal growth.One case of stricture was diagnosed at MRCP but preoperative finding came as normal.We false positively diagnosed the narrowing as stricture.5 cases of choledochal cyst and 2 cases of mirizzi syndrome were not diagnosed by ERCP.2 cases of stricture was misdiagnosed by ERCP due to underfilling of duct.Due to technical errors like endoscope distorting the distal bile duct,contrast material extravasation,overlapping of bowel gas,incomplete filling of ducts,contrast media induced allergic reactions,10 cases

were not diagnosed by ERCP .One case of stricture due to sclerosing cholangitis was not diagnosed by ERCP.The stricture was very narrow one.Of the 6 cases that were normal preoperatively,MRCP correctly detected 5 cases to be normal and ERCP correctly detected 4 cases to be normal.They had medical causes of abdominal pain.

MRCP was able to diagnosis 44 (88 %) cases against 6 (12 %) cases were missed to diagnose the extent of obstruction.. In ERCP 36 (72 %) were diagnosed but 14 (28 %) cases were missed to determine the extent of obstruction. In our study MRCP was able to diagnose more cases than ERCP and also the extent of obstruction.

In our study MRCP has 97.73 % sensitivity, 83.33 % Specificity & 96 % accuracy rate. ERCP has 83.33 % sensitivity, 66.67 % Specificity and accuracy in 76 % in determining the cause and extent of obstruction.

In our study MRCP's Sensitivity level (97.73 %) is more than ERCP (83.33 %) . MRCP determine accurately more cases than ERCP in both cause and extent of obstruction.

From that we can say that MRCP is superior to ERCP in

mapping out the extent of obstruction . This is use full in planning further management of the disease. Thus MRCP may replace ERCP for diagnostic purposes. ERCP may then be reserved for patients who required intervention in treating biliary obstruction.

MRCP is a comparable diagnostic investigation in comparison to ERCP for diagnosing biliary abnormalities. Results were particularly favourable for choledocholethiasis ,stricture ,malignancy and choledochal cyst .Less favourable for pancreatitis. The use of MRCP reduces the need for diagnostic ERCP which is associated with significant morbidity and mortality.

Magnetic Resonance Cholangio Pancratography (MRCP) is superior imaging modality when compared with Endoscopic Retrograde Cholangio Pancretography (ERCP) mainly because it is

1) Non invasive procedure
2) No radiation required
3) Anaesthesia is not required
4) Less operator dependent
5) Can be performed in patients in Whom endoscope access is unavailable or unsuccessful.

6) Demonstrates anatomic variants preoperatively.

7) It can give a detailed map of biliary tree allowing visualization of ducts proximals as well as distal to the level of obstruction

8) Can show the extent of lesion more accurately than ERCP.

The real benefits of ERCP, include:

1) ability to offer therapeutic intervention at the time of the diagnostic procedure;

2) Manometry can be performed;

3) The ampulla of Vater can be directly visualized;

4) The radiographic images obtained with ERCP have a higher spatial resolution..

Diagnostic ERCP is primarily used to demonstrate bile duct and cystic duct leaks.

Direct tissue sampling, can be performed during ERCP

5% of all ERCP attempts, have complications including pancreatitis, hemorrhage , gastrointestinaltract perforation, and hemorrhage .

- ❖ Contrast media induced allergic reactions is a major drawback in Diagnostic ERCP.

PIT FALLS OF MRCP

- Pitfalls include pseudo–filling defects, pseudodilatations, and non-visualization of the ducts.

- Pseudofilling defects are usually due to stones, air, tumors, hemorrhage, or sludge. Infrequent causes of filling defects include susceptibility artifact from adjacent clips, metallic bile duct stents, folds or flow voids.

- Pseudodilatations can occur if the cystic duct crosses the common bile duct or courses parallel to it or if extraductal fluid-filled structures (eg, intestine, pseudocysts, gallbladder) are volume averaged with the ducts.

- Nonvisualization of the intrahepatic bile ducts may be a normal finding due to nondistention; however, nonvisualization of the extrahepatic bile ducts may be due to obscuration by extraductal fluid-filled structures (eg, intestine, pseudocysts, gallbladder), intravenous administration of manganese, or pneumobilia.

PITFALLS OF ERCP

1) Pancreatic duct in the head of the pancreas may take a steep downward course to the papilla, paralleling the common bile duct. In this circumstance a partially filled pancreatic duct can be confused with the bile duct on fluoroscopy.

2) The main pancreatic duct is occasionally narrowed at its junction with the accessory duct; it is important not to misinterpret this normal variant asa duct stricture.

3) ERCP artifacts may be caused by endoscopic equipment (e.g., pressure from the cannula or endoscope distorting the distal bile duct), contrast material injected outside the ductal systems, nonpancreaticobiliary calcifications, bowel gas overlyingthe area of interest, incomplete filling of ducts, and unintentional injection of air.

4) Pancreatic duct artifacts are commonly caused by inadvertent contrast injection in an inappropriate location. Unintentional cannulation of a pancreatic duct side branch followed by contrast injection can lead to branch duct rupture and contrast extravasation .

5) Pancreatic duct underfilling is a frequent cause of erroneous diagnosis of ductal stricture or obstruction, usually when the tail has not been opacified.

6) Injection of contrast material that is too dense, particularly into a dilated duct, may obscure small calculi.Dilute contrast material is preferable when calculi are suspected,especially in a dilated common duct .

7) A contracted biliary sphincter may mimic a stricture or calculus of the distal bile duct.

8) Streaming of contrast material in the bile duct refers to contrast material flowing along the dependent wall of a dilated duct rather than completely filling the lumen. This effect causes an illusion of normal caliber when the duct is dilated further contrast injection shows the true size of the duct.

CONCLUSION

MRCP has highest sensitivity, specificity, and diagnostic accuracy than ERCP in diagnosing obstruction due to pancreaticobiliary disorders. MRCP is able to determine accurately more cases than ERCP in both cause and extent of obstruction. Anatomy of biliary tree is well delineated by MRCP. Bileducts proximal as well as distal to the level of obstruction is made out better by MRCP. Due to invasiveness and contrast media induced allergic reactions, diagnostic usage of ERCP is limited .ERCP is mainly reserved for patients who required intervention in treating biliary obstruction.

From this we can conclude that MRCP is more sensitive and specific in diagnosing pancreaticobiliary disorders than ERCP. ERCP is mainly used for therapeutic purposes.

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PROFORMA

Accuracy of Magnetic resonance cholangiopancreatography Vs Endoscopic retrograde cholangiopancreatography in the evaluation of pancreaticobiliary disorders

Sl. No : Date:

Name: IP No:

Age/ Sex: Occupation:

Address:

Presenting Complaints

Yellowish discolouration of skin :

Dark coloured urine :

Clar coloured stools :

Pruritis :

Fever :

Nausea and Vomiting :

Abdomen Pain :

Abdomen Mass :

Loss of Appetite :

Loss of weight :

Past History

H/o. Abdominal Surgery :

Vital Signs

Pulse :

BP :

General Examination

		Yes	No
Built	:		
Anaemia	:		
Jaundice	:		
Lymphadenopathy	:		

Examination of Abdomen

Abdomen Tenderness :

Abdomen Mass :

DEPARTMENT OF GASTROENTEROLOGY

RAJIV GANDHI GOVT. GENERAL HOSPITAL, CHENNAI-3.

ERCP

(Endoscopic Retrograde Cholangio Pancreatography)

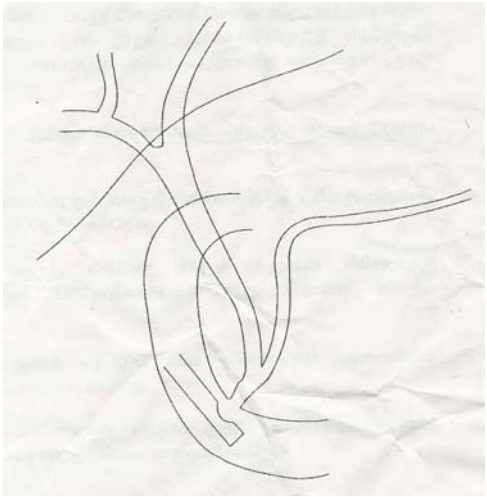
Name: Age/ Sex: IP No:

Diagnosis: Date:

Indication(s): Premedications:

Upper GI Endoscopy

Procedure



1.5 TESLA SIEMENS MRI

ENDOSCOPY

C-ARM FLUORO UNIT

GUIDEWIRE

BIOPSY FORCEPS

IOHEXOL


℞
50 ml
IOHEXOL INJECTION USP
NIOSCAN 350
नीओस्केन ३५०
FOR INTRAVASCULAR USE
For Angiography, Urography,
Neuroradiology, Arthrography & Contrast
Enhancement In Computed Tomography
Manufactured in India by :
UNIJULES
LIFE SCIENCES LTD.
D-82, MIDC Area, Hingna
Nagpur - 440 028
USP 755 mg
350 mg
USP 1.21 mg
USP 0.10 mg
IP q.s
17.5g
Store at controlled room
Do not refrigerate.
reach of children.

INSTITUTIONAL ETHICS COMMITTEE
MADRAS MEDICAL COLLEGE, CHENNAI -3

Telephone No: 044 25305
Fax: 044 25363

CERTIFICATE OF APPROVAL

To
Dr. A. Mahaboobkhan
PG in MD Radiodiagnosis
Madras Medical College, Chennai -3

Dear Dr .A. Mahaboobkhan

The Institutional Ethics committee of Madras Medical College, reviewed and discus your application for approval of the proposal entitled "A study on Accuracy of Magn resonance cholangiopancreatography vs endoscopic retrograde cholangiopancreatogra in the evaluation of Pancreaticobiliary disorders " No. 09092011

The following members of Ethics Committee were present in the meeting held 27.09.2011 conducted at Madras Medical College, Chennai -3.

1.	Prof. S.K. Rajan. MD	-- Chairperson
2.	Dr. V. Kanagasabai MD Dean, Madras Medical College, Chennai -3	-- Deputy Chairman
3.	Prof. A. Sundaram MD Vice Principal, Madras Medical College, Ch -3	-- Member Secretary
4.	Prof. R. Nandhini MD Director, Institute of Pharmacology ,MMC, Ch-3	-- Member
5.	Prof. Pregna B Dolia MD Director , Inst. of Biochemistry, MMC, Ch-3	-- Member
6.	Thiru. A. Ulaganathan Administrative Officer, MMC, Ch-3	--- Layperson
7.	Thiru. S. Govindsamy. BA BL	-- Lawyer
8.	Tmt. Arnold soulina MA	-- Social Scientist

We approve the proposal to be conducted in its presented form.

Sd/ chairman & Other Membe

The Institutional Ethics Committee expects to be informed about the progress of the st and SAE occurring in the course of the study, any changes in the protocol and pati information / informed consent and asks to be provided a copy of the final report.

Member Secretary, Ethics Comm

ஆராய்ச்சி ஒப்புதல் கடிதம்

ஆராய்ச்சி தலைப்பு

மஞ்சட்காமாலை பாதிக்கப்பட்ட நோயாளிகளிடம் எம்.ஆர்.சி.பி. மற்றும் ஈ.ஆர்.சி.பி. பரிசோதனை குறித்த ஆய்வு

பெயர் : தேதி :

வயது : உள்நோயாளி எண் :

பால் : ஆராய்ச்சி சேர்க்கை எண் :

இந்த ஆராய்ச்சியின் விவரங்களும் அதன் நோக்கம் முழுமையாக எனக்கு தெளிவாக விளக்கப்பட்டது.

எனக்கு விளக்கப்பட்ட விஷயங்களை நான் புரிந்து கொண்டு எனது சம்மதத்தை தெரிவிக்கிறேன்.

இந்த ஆராய்ச்சியில் பிறரின் நிர்ப்பந்தமின்றி என் சொந்த விருப்பத்தின் பேரில் நான் பங்கு பெறுகிறேன் மற்றும் நான் இந்த ஆராய்ச்சியிலிருந்து எந்நேரமும் பின்வாங்கலாம் என்பதையும் அதனால் எந்த பாதிப்பும் ஏற்படாது என்பதையும் நான் புரிந்து கொண்டேன்.

எனக்கு, இந்த ஆராய்ச்சி குறித்த விவரங்களைக் கொண்ட தகவல் தாளைப் பெற்றுக்கொண்டேன்.

எனக்கு, கதிர்வீச்சு சிகிச்சை மற்றும் மருந்து சிகிச்சை முடிந்த பிறகு அறுவை சிகிச்சை செய்து கொள்ள சம்மதம் தெரிவிக்கிறேன்.

கதிர்வீச்சு சிகிச்சை, மருந்து சிகிச்சை மற்றும் அறுவை சிகிச்சைக்கு தேவையான சிறப்பு மருத்துவ பரிசோதனைகள் செய்து கொள்ள சம்மதம் தெரிவிக்கிறேன்.

இந்த ஆராய்ச்சியின் மூலம் ஏற்படும் பக்க விளைவுகள் அனைத்தும், மருத்துவரால் எனக்கு புரியும்படி விளக்கப்பட்டது.

நான் என்னுடைய சுயநினைவுடன் மற்றும் முழு சுதந்திரத்துடன் இந்த மருத்துவ ஆராய்ச்சியில் என்னை சேர்த்துக் கொள்ள சம்மதிக்கிறேன்.

கையொப்பம்

தேதி :

ABBREVIATIONS

OJ-Obstructive Jaundice

PA-Pain abdomen

C-Cholangitis

CC-Common bile duct calculus

GC+CC-Gallbladder calculus+Common bile duct calculus

BS-PC-Benign stricture-Post Cholecystectomy

MS-KT-Malignant stricture-Klatskin tumour

PC-Periampullary Carcinoma

PA-C-Pancreatic Carcinoma

G-Ca-Gallbladder Carcinoma

C-Ca-Cholangiocarcinoma

CH-P-Chronic pancreatitis

Ch-Cy-Choledochal cyst

PS-Ch-Primary Sclerosing Cholangitis

Mi-Sy-Mirizzi Syndrome

D-Determined

ND-Not Determined

SSFSE-Single Shot Fast Spin Echo

SSFP-Steady State Free Precession

FOV-Field of view

RAO-Right Anterior Oblique

LAO-Left Anterior Oblique

PTC-Percutaneous Transhepatic Cholangiography

HASTE- Half fourier acquisition with turbo spin echo

TRUFI- True free inducti9n with steady precession

SD-Standard Deviation

PPV-Positive Predictive Value

NPV-Negative Predictive Value

ROC-Receiver Operating Characteristic

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S.No	Name	Age	Sex	Presenting complaints	MRCP		ERCP		Peroperative findings
					Cause of Obstr	Extent of Obstruction	Cause of Obst	Extent of Obstruction	
1	Muthammal	42	F	OJ	PC	D	ND	ND	PC
2	Veerammal	58	F	PA	BS-PC	D	ND	ND	NORMAL
3	Selvam	52	M	PA	ND	ND	CC	D	NORMAL
4	Ramesh	36	M	PA	Ch-Cy	D	Ch-Cy	ND	Ch-Cy
5	Muhesh	40	M	OJ	CC	D	CC	D	CC
6	Pandi	52	M	OJ	G.Ca	D	G.Ca	D	G.Ca
7	Mohanraj	46	M	PA	CH-P	D	CH-P	D	CH-P
8	Annam	58	F	OJ	C.Ca	D	C.Ca	D	C.Ca
9	Sampath	42	M	C	PC	D	PC	D	PC
10	Vijaya	39	F	OJ	MS-KT	D	MS-KT	D	MS-KT
11	Kotti	46	M	C	BS-PC	D	BS-PC	D	BS-PC
12	Kathirvelu	39	M	C	Pa-C	D	Pa-C	D	Pa-C
13	Kumar	52	M	OJ	GC+CC	D	GC+CC	D	GC+CC
14	Rani	29	F	PA	Ch-Cy	D	Ch-Cy	ND	Ch-Cy
15	Mahesh	39	M	C	CC	D	CC	D	CC
16	Valli	46	F	PA	BS-PC	D	BS-PC	D	BS-PC
17	Jamuna	39	F	OJ	MS-KT	D	MS-KT	D	MS-KT
18	Mani	46	M	OJ	PC	D	PC	D	PC
19	Devi	42	F	PA	BS-PC	D	BS-PC	D	BS-PC
20	Sivaraj	52	M	OJ	G.Ca	D	G.Ca	D	G.Ca
21	Muthu	39	M	PA	Mi-Sy	D	Mi-Sy	ND	Mi-sy
22	Kannagi	46	F	OJ	MS-KT	D	MS-KT	D	MS-KT
23	Selvi	49	F	OJ	PC	D	PC	D	PC
24	Mariammal	52	F	PA	ND	ND	CC	D	NORMAL

25	Sundar	39	M	OJ	G.Ca	D	G.Ca	D	G.Ca
26	Kannan	29	M	PA	Ch-Cy	D	Ch-Cy	ND	Ch-Cy
27	Vanitha	46	F	PA	PS-Ch	D	Ps-Ch	D	Ps-Ch
28	Prasanna	45	M	PA	GC+CC	D	GC+CC	D	GC+CC
29	Ravi	29	M	OJ	CC	D	CC	D	CC
30	Senthil	60	M	PA	CH-P	D	CH-P	D	CH-P
31	Abdul	54	M	C	ND	ND	ND	ND	NORMAL
32	Manohari	54	F	OJ	MS-KT	D	MS-KT	D	MS-KT
33	Sumathi	46	F	PA	BS-PC	D	BS-PC	D	BS-PC
34	Mehala	24	F	PA	Ch-Cy	D	Ch-Cy	ND	Ch-Cy
35	Vadivelu	52	M	OJ	ND	ND	ND	ND	MS-KT
36	Kumutha	49	F	OJ	CC	D	CC	D	CC
37	Kamatchi	36	F	PA	ND	ND	ND	ND	NORMAL
38	Priyanka	39	F	PA	BS-PC	D	BS-PC	D	BS-PC
39	Seetha	42	F	OJ	PC	D	PC	D	PC
40	Saravanan	56	M	OJ	MS-KT	D	MS-KT	D	MS-KT
41	Muthukumar	46	M	PA	Mi-Sy	D	Mi-Sy	ND	Mi-sy
42	Vajravelu	33	M	C	Pa-C	D	Pa-C	D	Pa-C
43	Dhinakar	39	M	PA	Ps-Ch	D	ND	ND	Ps-Ch
44	Hariprasadh	41	M	PA	CH-P	D	CH-P	D	CH-P
45	Senthil Kuma	40	M	OJ	BS-PC	D	BS-PC	D	BS-PC
46	Kalyani	39	F	PA	ND	ND	ND	ND	NORMAL
47	Rajamani	46	F	OJ	MS-KT	D	MS-KT	D	MS-KT
48	Gopalan	37	M	OJ	G-Ca	D	G-Ca	D	G-Ca
49	Sukumar	46	M	C	PC	D	PC	D	PC
50	Sudha	26	F	OJ	Ch-Cy	D	Ch-Cy	ND	Ch-Cy

Mi-Sy- Mirizzi Syndrome

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GC+ CC- GB calculus & CBD Calculus

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Ps-Ch- Primary Sclerosing Cholangitis

D- Determined

ND- Not determined

ABSTRACT

Aim of the study

A study on accuracy of Magnetic Resonance Cholangio Pancreatography{MRCP} Vs Endoscopic Retrograde Cholangio Pancreatography [ERCP] in Pancreatico Biliary Disorders

Materials and Methods

- **Study design: prospective study**
- **Place: Barnard Institute of Radiology, Rajivgandhi government general hospital. Madras Medical College, Chennai-3**
- **Collaborating Unit: Department of Medical Gastroenterology, Rajivgandhi government general hospital. Madras Medical College, Chennai-3**

  Study population 50 patients were included in the study. The study group consisted of male and female patients, between the age of 22 to 65 years (with a mean age of 43 years). For all 50 patients per operative findings were obtained.The study was Approved by the ethical committee .
- **Sample Size:50**
- **Consent -Informed consent obtained from all patients**
- **Inclusion Criteria**
- **Patients who were having a history of obstructive jaundice,pain abdomen and cholangitis**
- **50 patients with these symptoms underwent MRCP using 1.5 Tesla Siemens Symphony MRI scanner.**

- **The same patientswere underwent ERCP,and the results were**
- **Compared with preoperative findings.**
- **Exclusion Criteria**
- **Pts with claustrophobia**
- **Pts with cardiac pacemakers**
- **Pts with cochlear implants**
- **Hemodynamically unstable patients**

Causes of biliary obstruction

In our study causes of biliary obstruction was divided into 5 types like calculus,stricture,tumour,cyst,and extrinsic causes.

Results

VARIABLE	MRCP	ERCP
Sensitivity	97.72%	77.27%
Specificity	83%	66.66%
Positive Predictive Value	97.72%	94.44%
Accuracy	96%	76%

Discussion

Comparison of MRCP with ERCP based on Cause of Obstruction. MRCP was Determined Calclulus in 6 (12 %) cases and also ERCP was picked up 6 (12 %) cases. No cases were missed by both.. In stricture MRCP has missed 1 (2 %) cases but ERCP has failed to Determined 2 (4 %) cases. ERCP has missed to diagnosis 1 tumor (2 %) cases, 5 cyst cases(10 %) and 2 cases of extrinsic

causes(4 %) but MRCP was not missed such a cases. MRCP was able to diagnosis 44 (88 %) cases against 6 (12 %) cases were missed to diagnose the extent of obstruction.. In ERCP 36 (72 %) were diagnosed but 14 (28 %) cases were missed to determine the extent of obstruction. In our study MRCP was able to diagnose more cases than ERCP and also the extent of obstruction. In our study MRCP has 97.73 % sensitivity, 83.33 % Specificity & 96 % accuracy rate. ERCP has 83.33 % sensitivity, 66.67 % Specificity and accuracy in 76 % in determining the cause and extent of obstruction. In our study MRCP's Sensitivity level (97.73 %) is more than ERCP (83.33 %) . MRCP determine accurately more cases than ERCP in both cause and extent of obstruction.

Conclusion

MRCP has highest sensitivity, specificity,and diagnostic accuracy than ERCP in diagnosing obstruction due to pancreaticobiliary disorders. MRCP is able to determine accurately more cases than ERCP in both cause and extent of obstruction. Anatomy of biliary tree is well delineated by MRCP .Bileducts proximal as well as distal to the level of obstruction is made out better by MRCP. Due to invasiveness and contrast media induced allergic reactions,diagnostic usage of ERCP is limited .ERCP is mainly reserved for patients who required intervention in treating biliary obstruction.

From this we can conclude that MRCP is more sensitive and specific in diagnosing pancreaticobiliary disorders than ERCP.ERCP is mainly used for therapeutic purposes.